OIPE
APR 11 2005
JC48
PATENT & TRADEMARK OFFICE

FIG.1
PRIOR ART

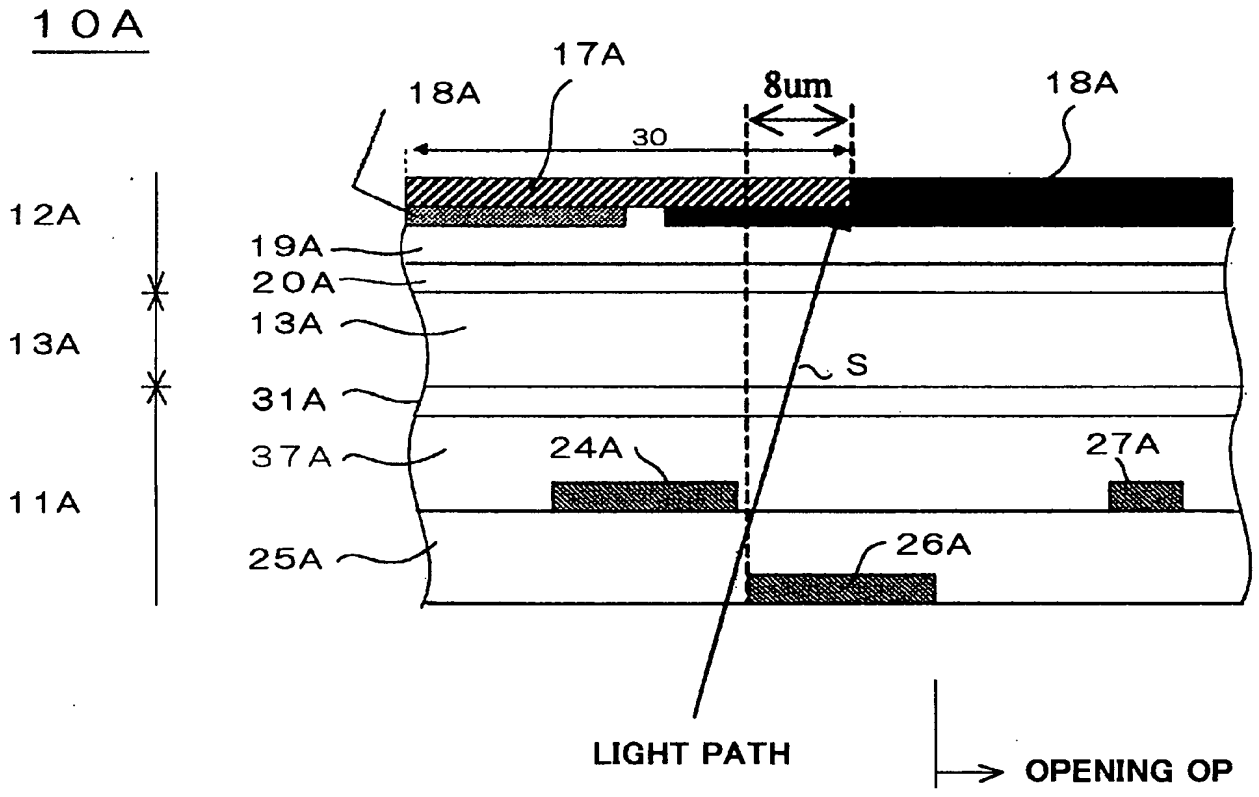


FIG.2

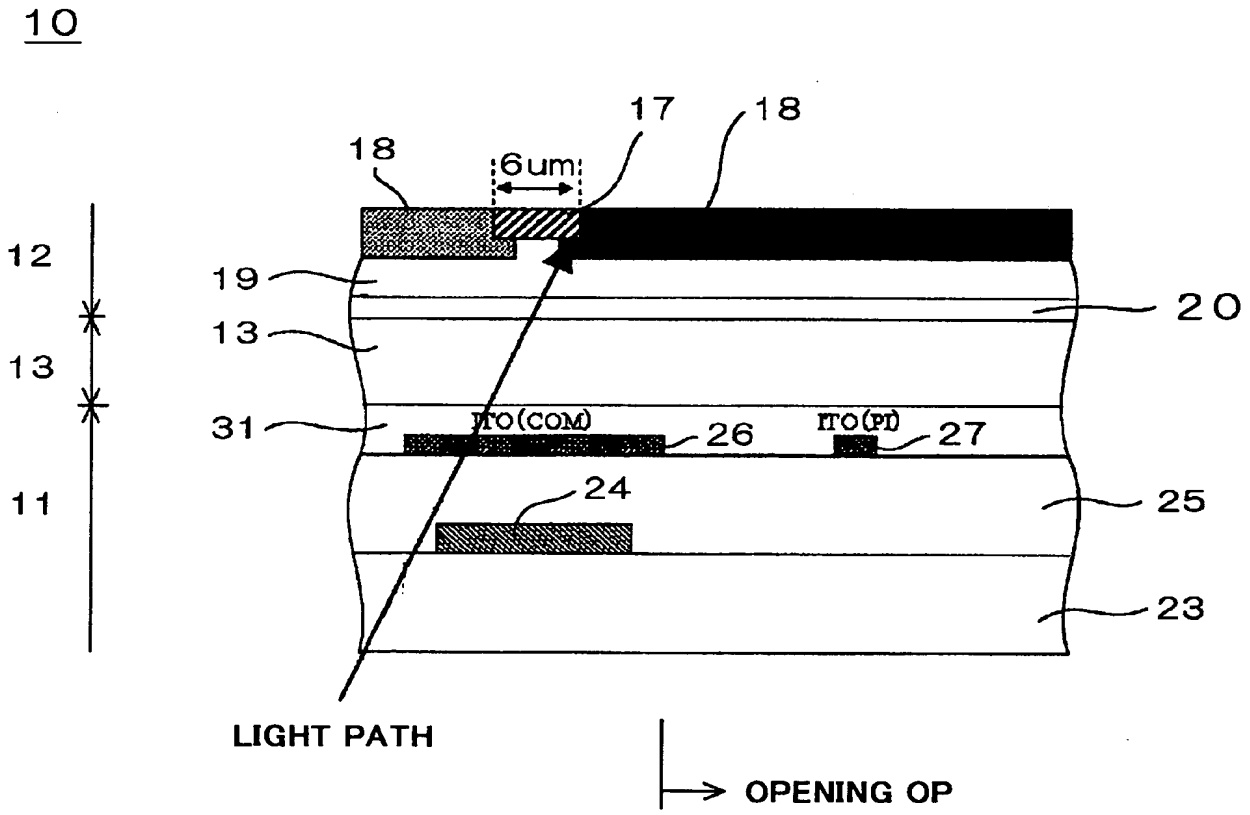

10
17
18
18
6um
12
19
20
13
13
31
ITO(COM)
26
ITO(PI)
27
11
24
25
23
LIGHT PATH
OPENING OP

FIG.3

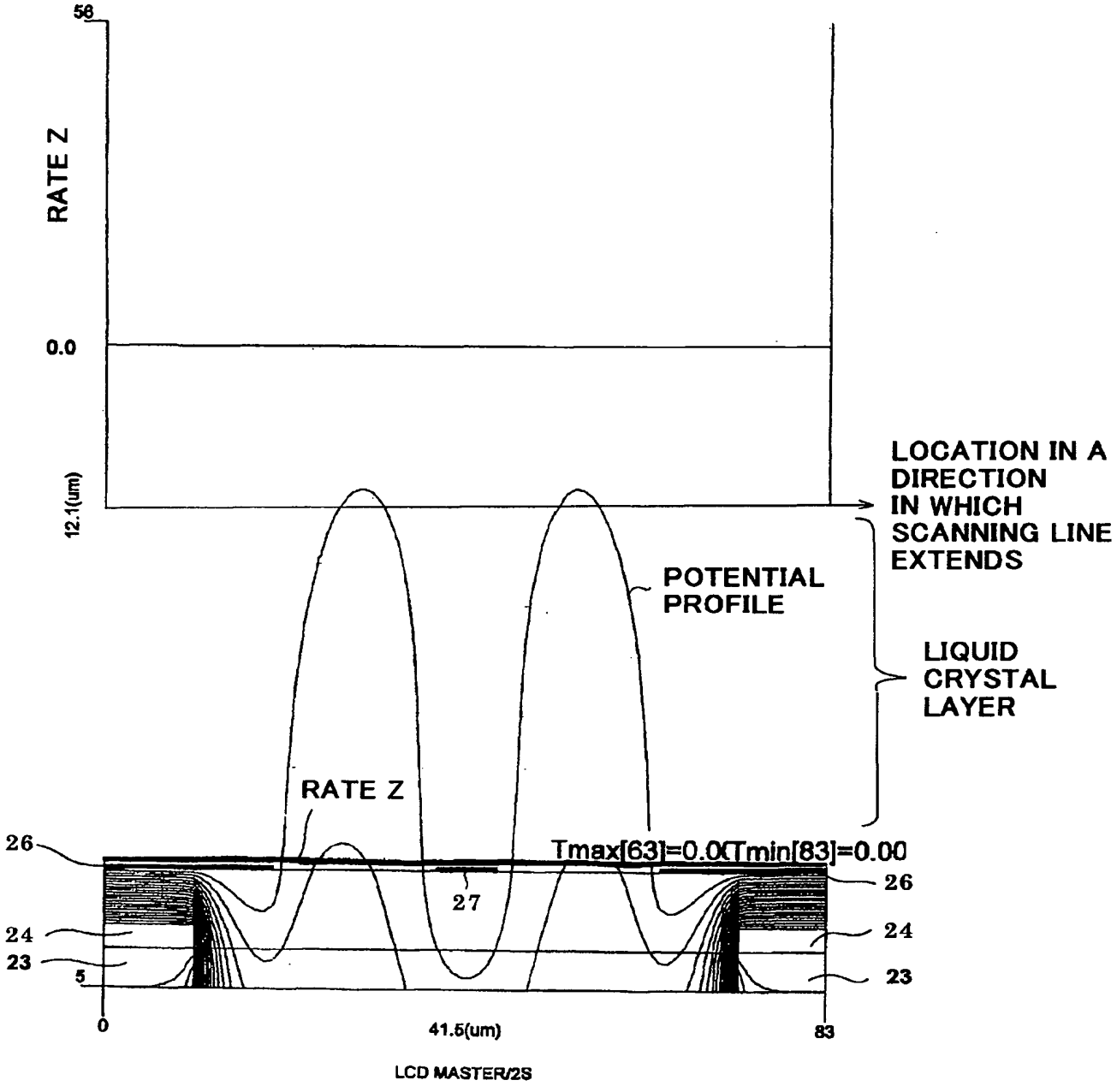

58
RATE Z
0.0
12.1(um)
LOCATION IN A DIRECTION IN WHICH SCANNING LINE EXTENDS
POTENTIAL PROFILE
LIQUID CRYSTAL LAYER
RATE Z
Tmax[63]=0.0(Tmin[83]=0.00
26
27
24
23
5
0
41.5(um)
83
LCD MASTER/2S

FIG.4

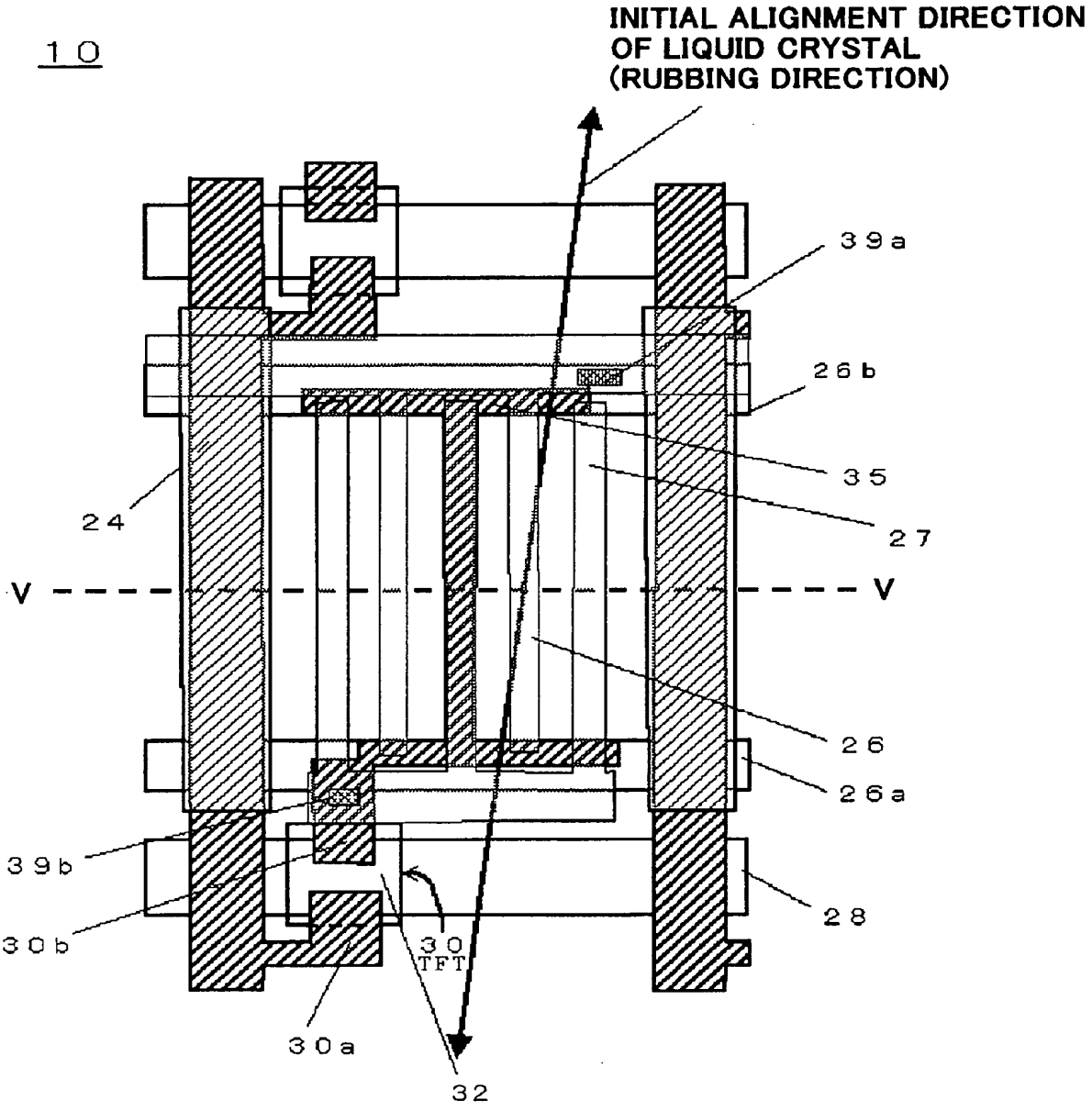

10
INITIAL ALIGNMENT DIRECTION
OF LIQUID CRYSTAL
(RUBBING DIRECTION)
39a
26b
35
27
24
V
V
26
26a
39b
30b
28
30
TFT
30a
32

FIG.5

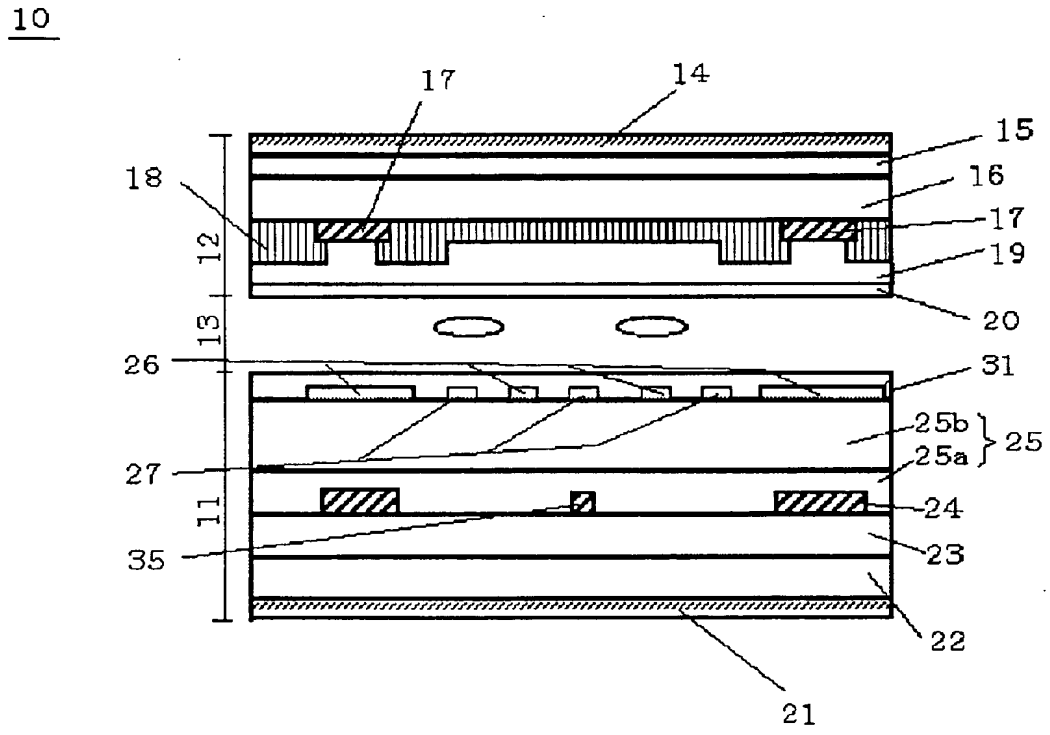


FIG.6

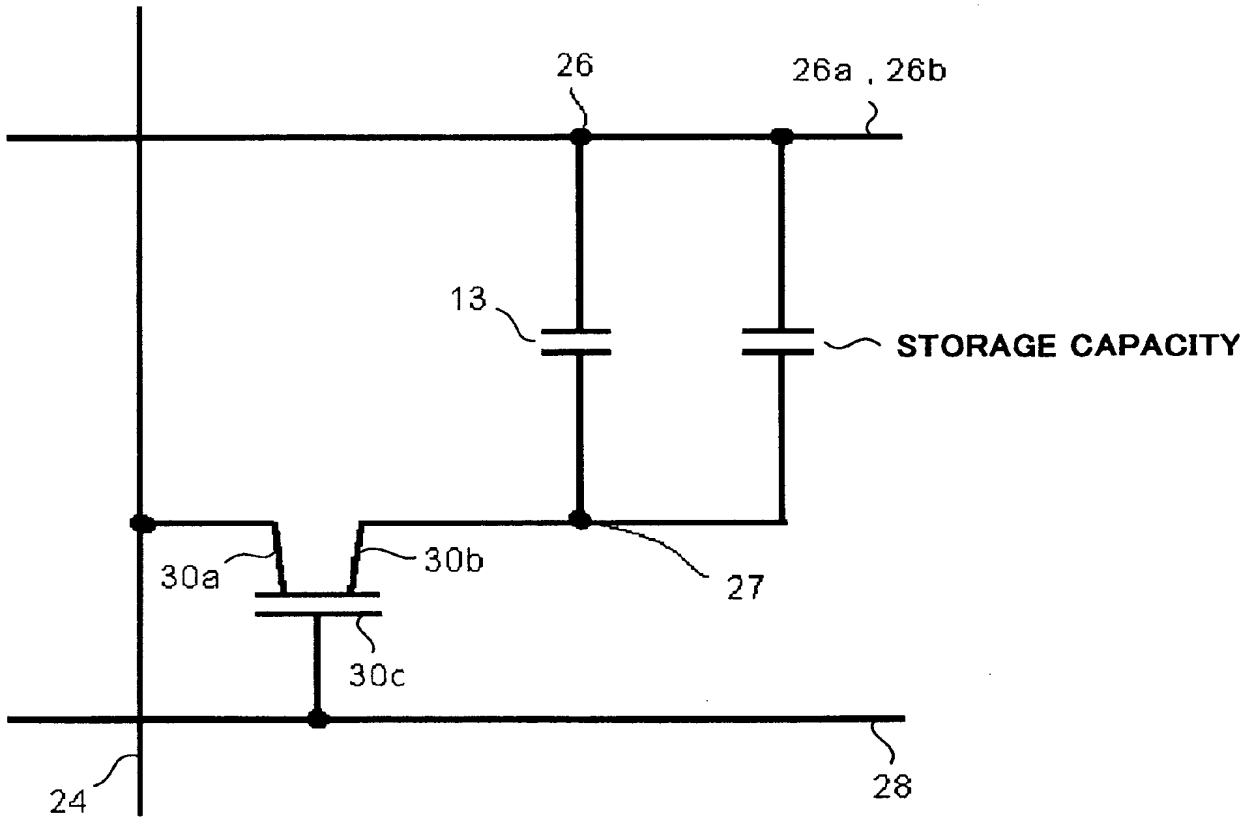


FIG.7

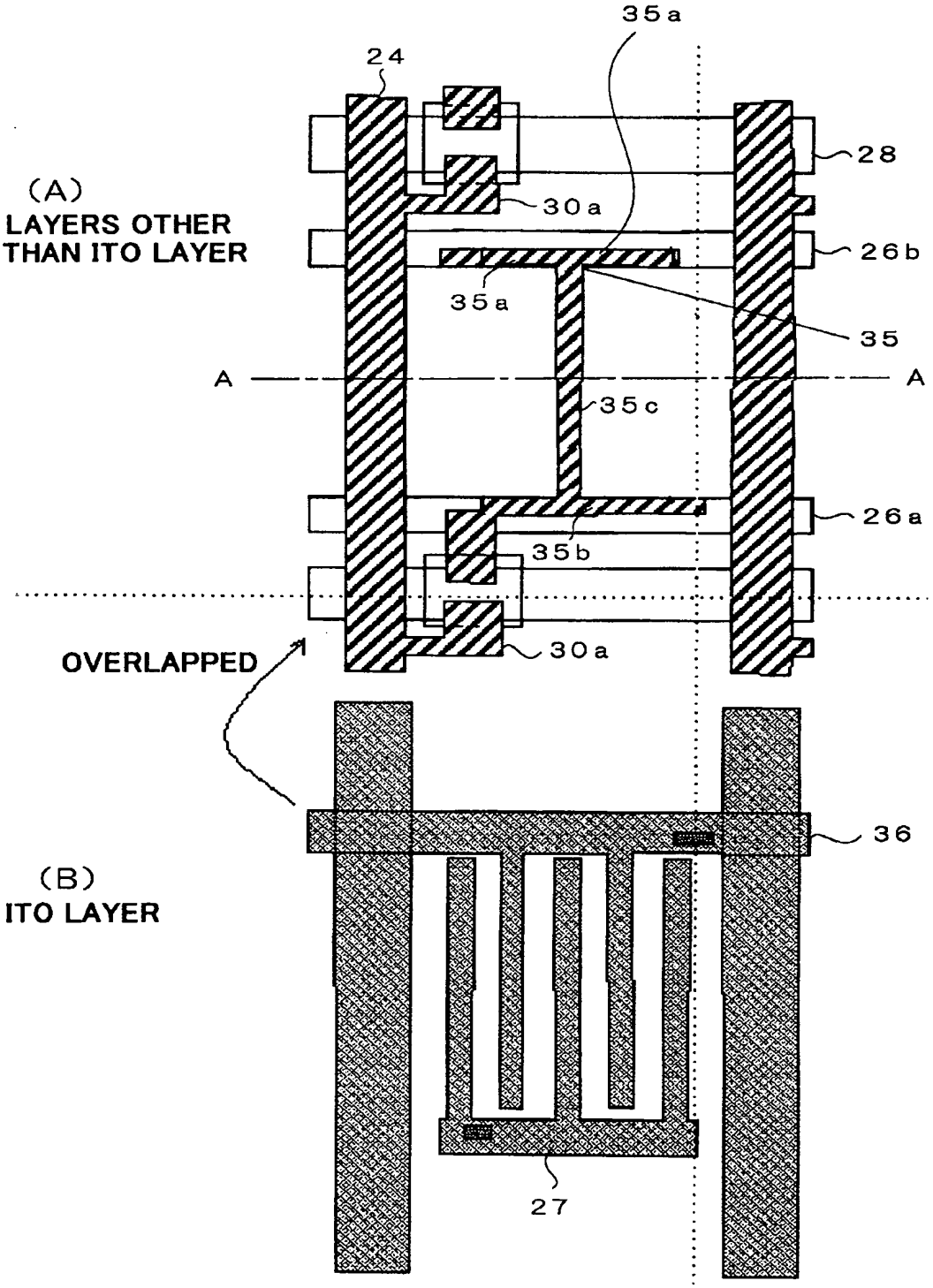

35a
24
28
(A)
LAYERS OTHER
THAN ITO LAYER
30a
26b
35a
35
A
A
35c
26a
35b
OVERLAPPED
30a
36
(B)
ITO LAYER
27

FIG.8

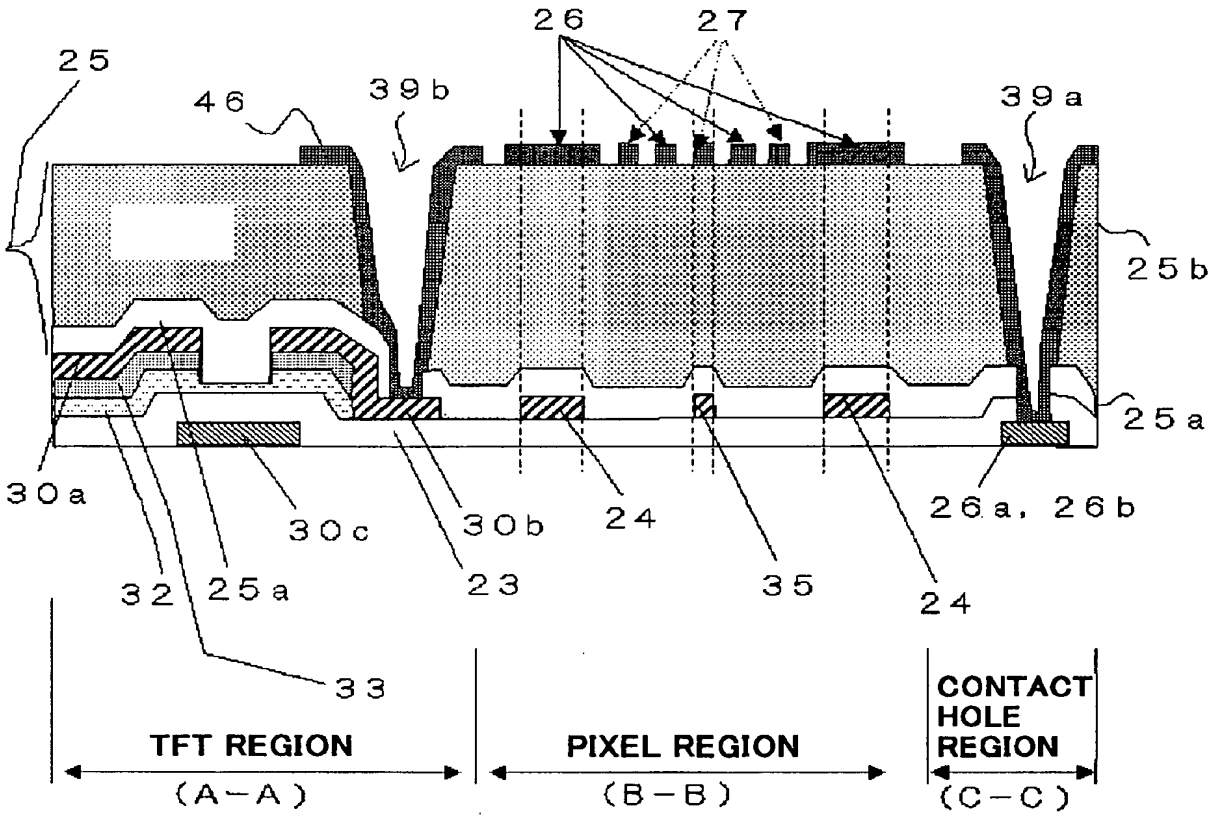

26
27
25
46
39b
39a
25b
25a
30a
30c
30b
24
26a, 26b
32
25a
23
35
24
33
TFT REGION
(A-A)
PIXEL REGION
(B-B)
CONTACT HOLE REGION
(C-C)

FIG.9

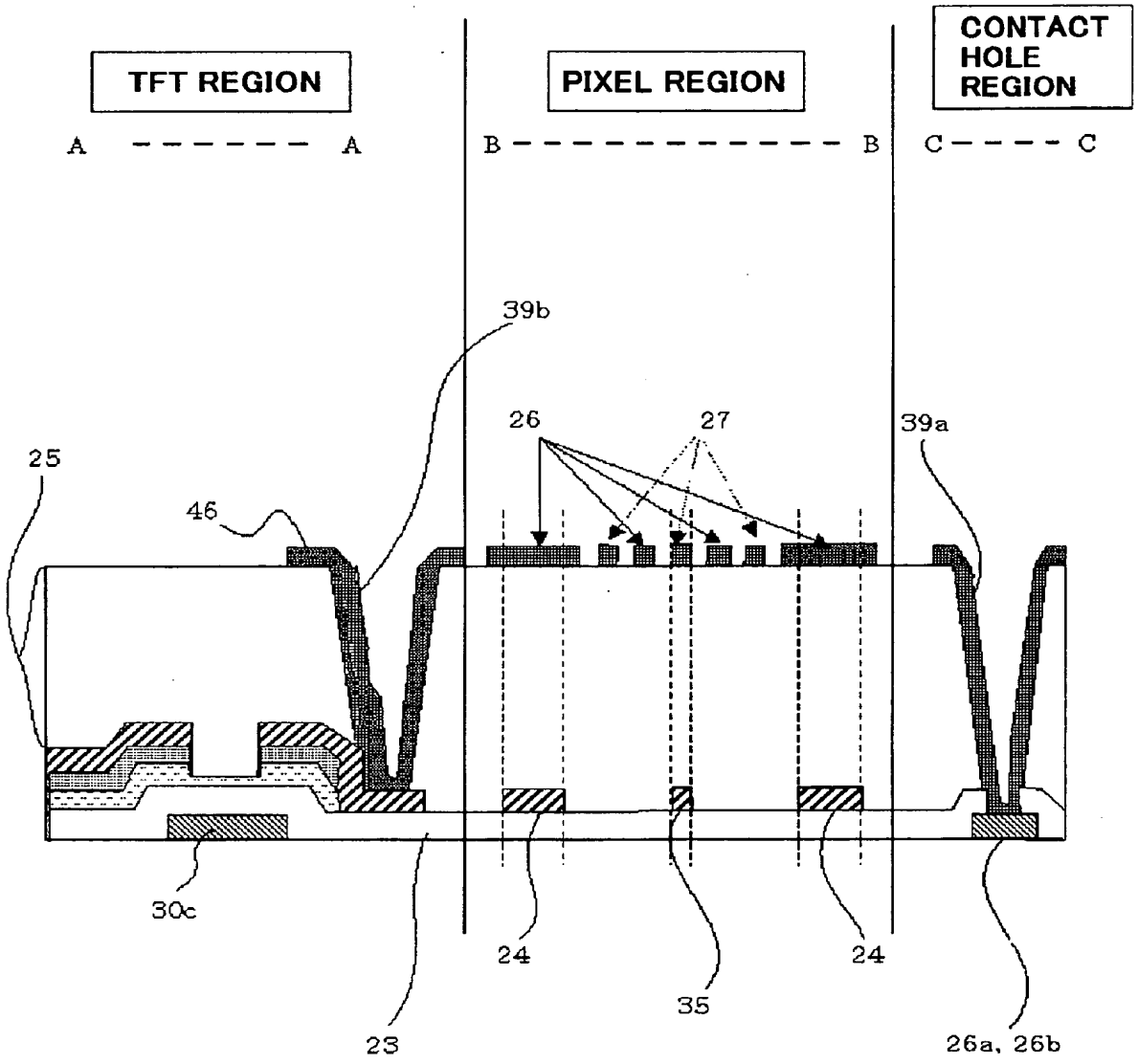

TFT REGION
PIXEL REGION
CONTACT HOLE REGION
A
A
B
B
C
C
39b
26
27
39a
25
46
30c
24
24
35
23
26a, 26b

FIG.10

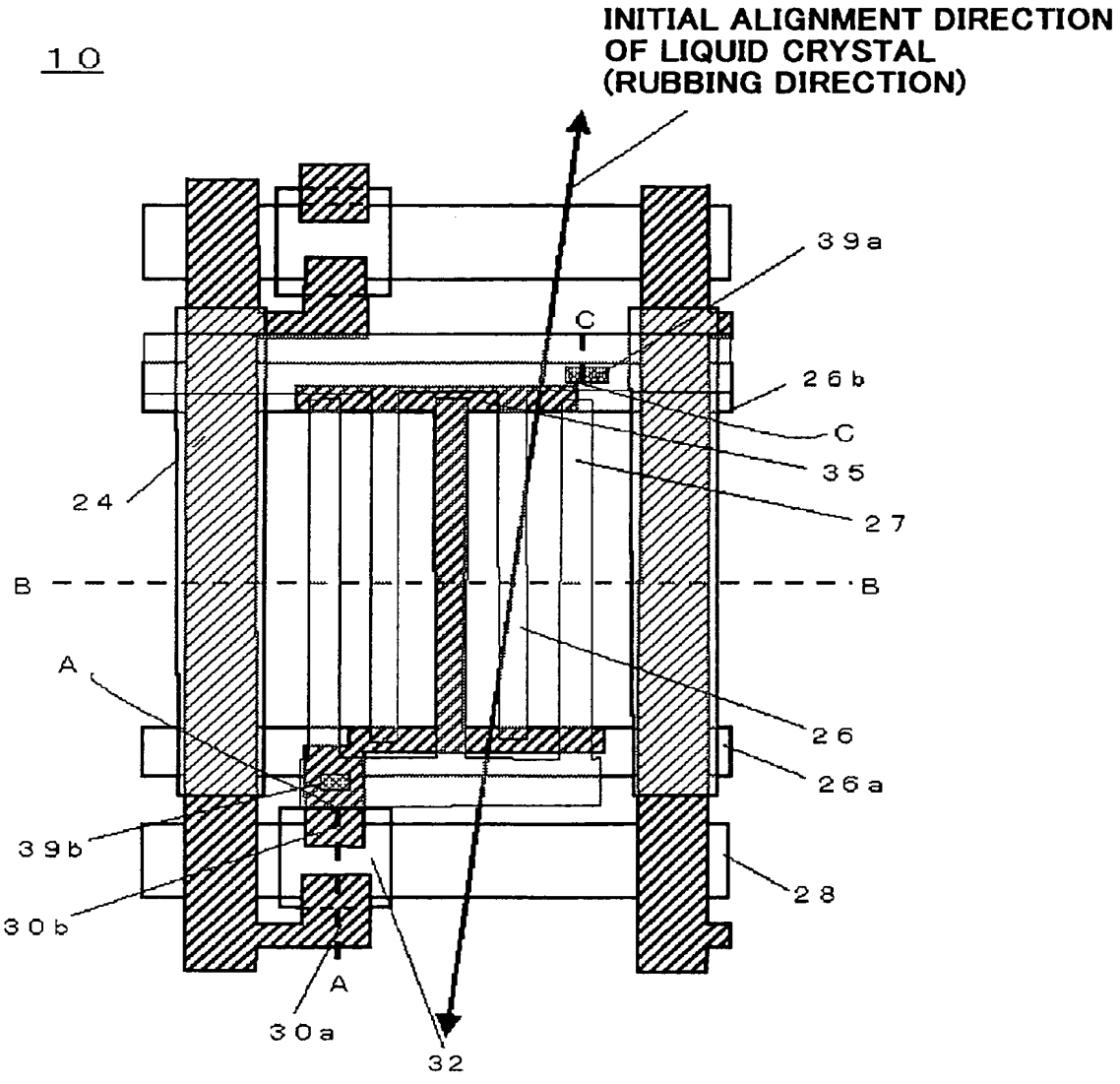
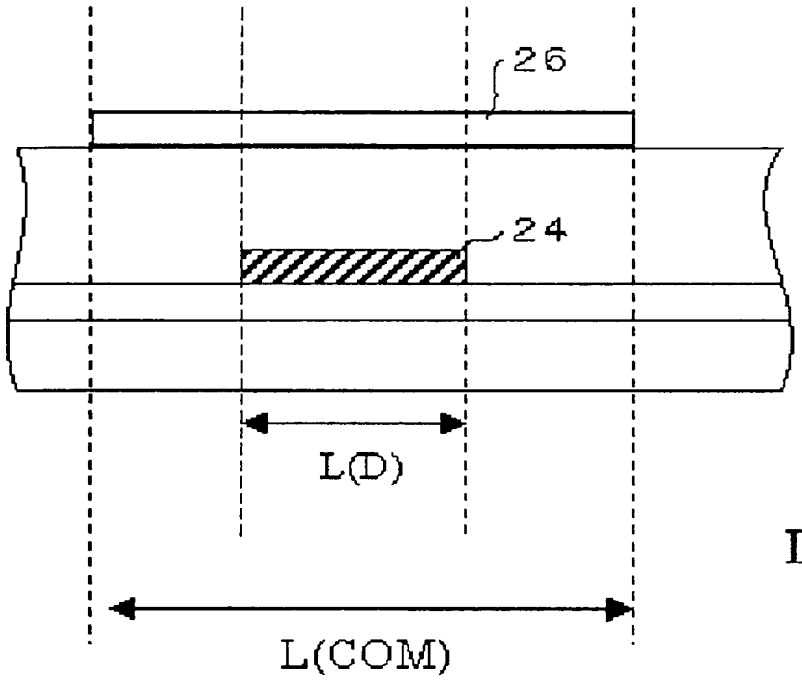
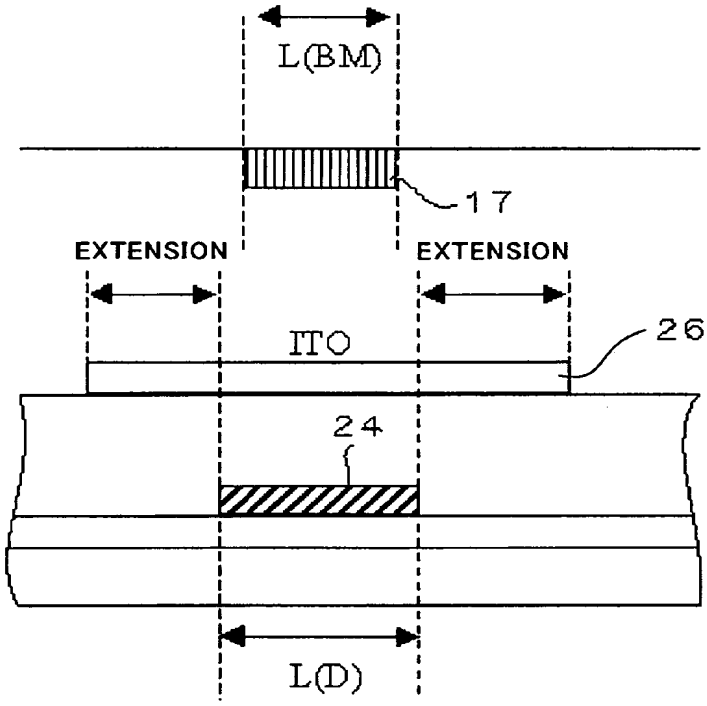

10
INITIAL ALIGNMENT DIRECTION
OF LIQUID CRYSTAL
(RUBBING DIRECTION)
39a
C
26b
C
35
27
24
B
B
A
26
26a
39b
28
30b
A
30a
32

FIG.11



$$L(COM) > L(D)$$

FIG.12



$L(D) > L(BM)$

FIG.13

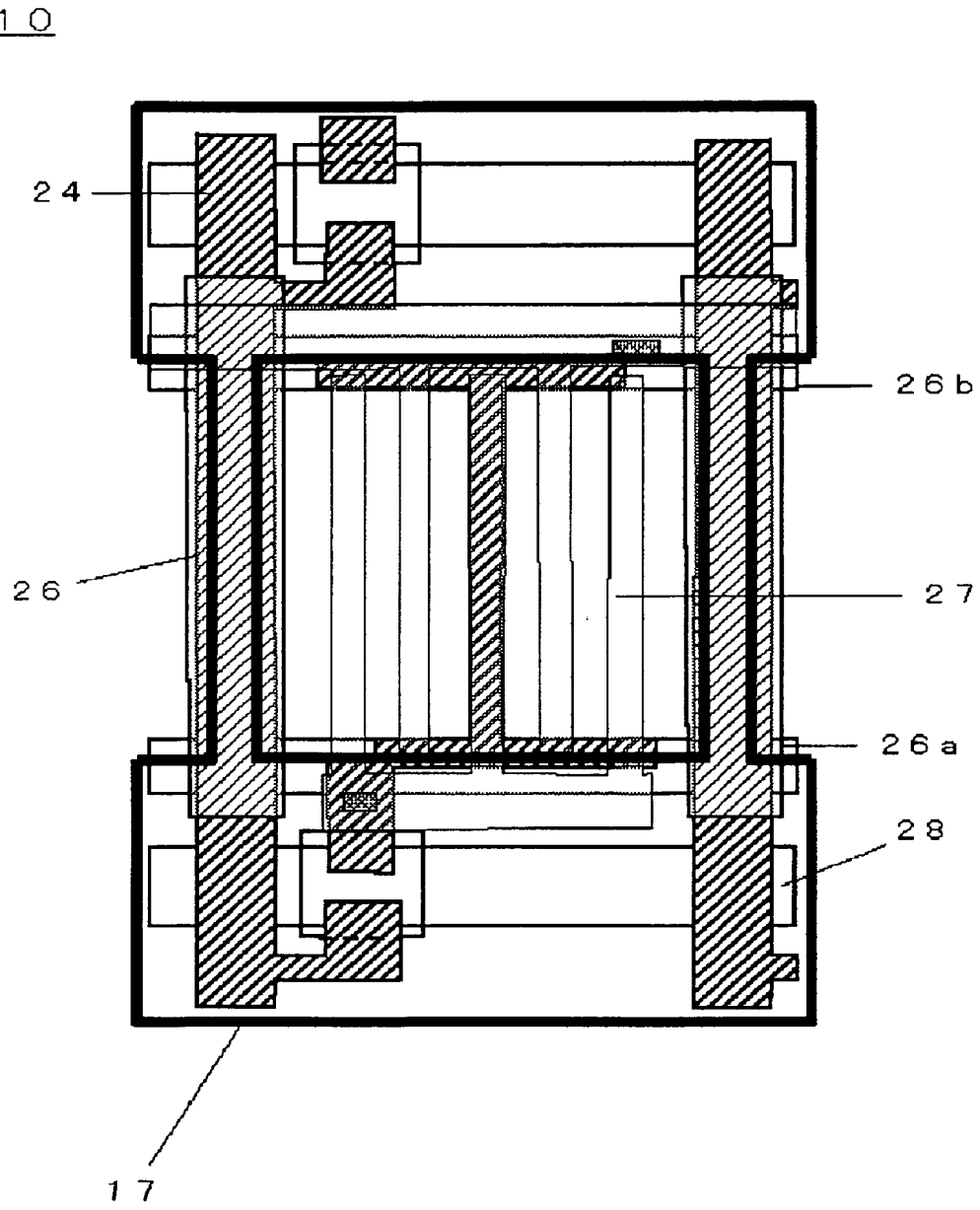


FIG.14

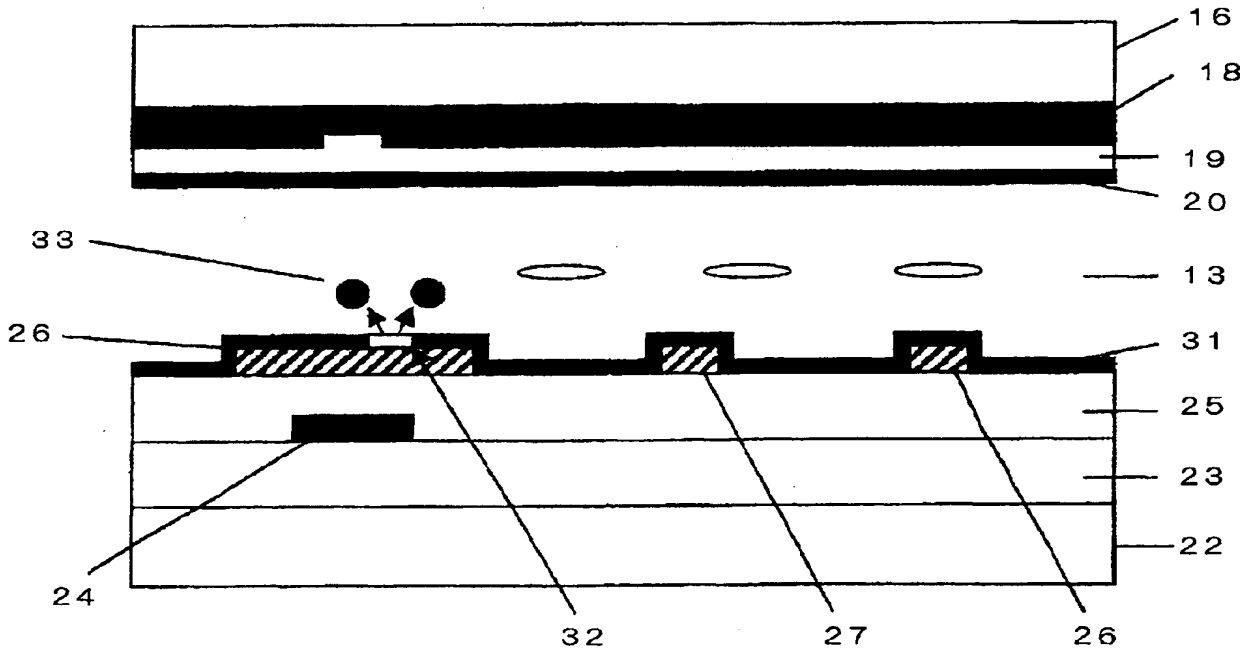


FIG.15

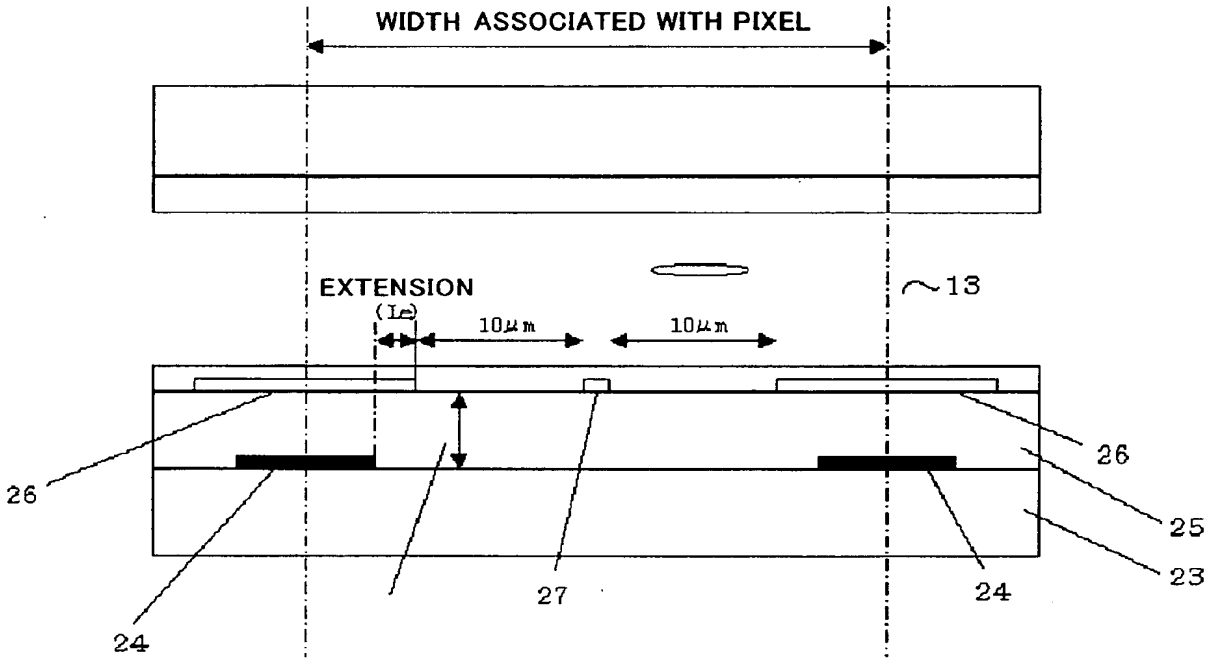

WIDTH ASSOCIATED WITH PIXEL
EXTENSION
(Le)
10μm
10μm
13
26
26
25
23
24
27
24

FIG.16

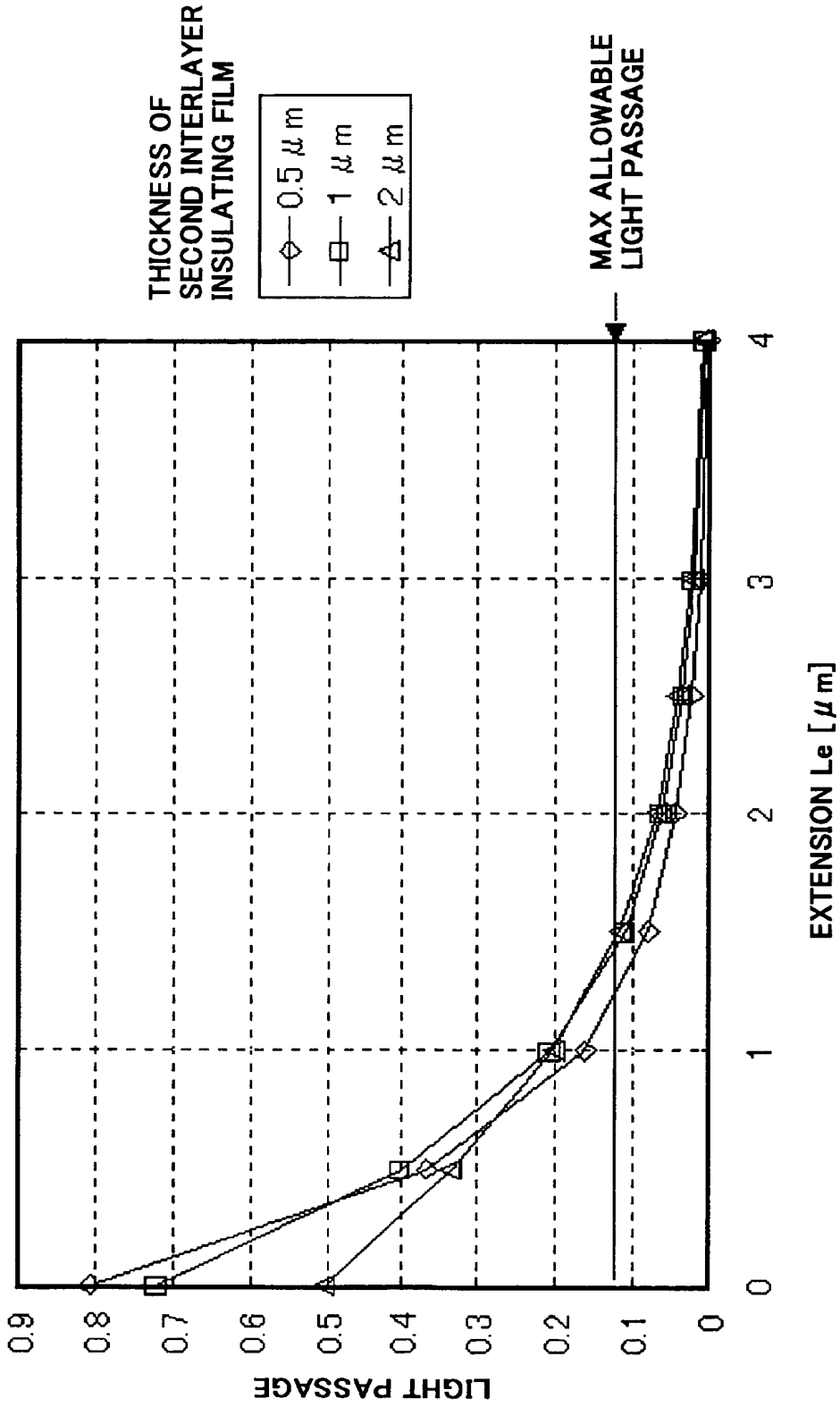

THICKNESS OF
SECOND INTERLAYER
INSULATING FILM
0.5 μm
1 μm
2 μm
MAX ALLOWABLE
LIGHT PASSAGE
LIGHT PASSAGE
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
1
2
3
4
EXTENSION Le [μm]

FIG.17

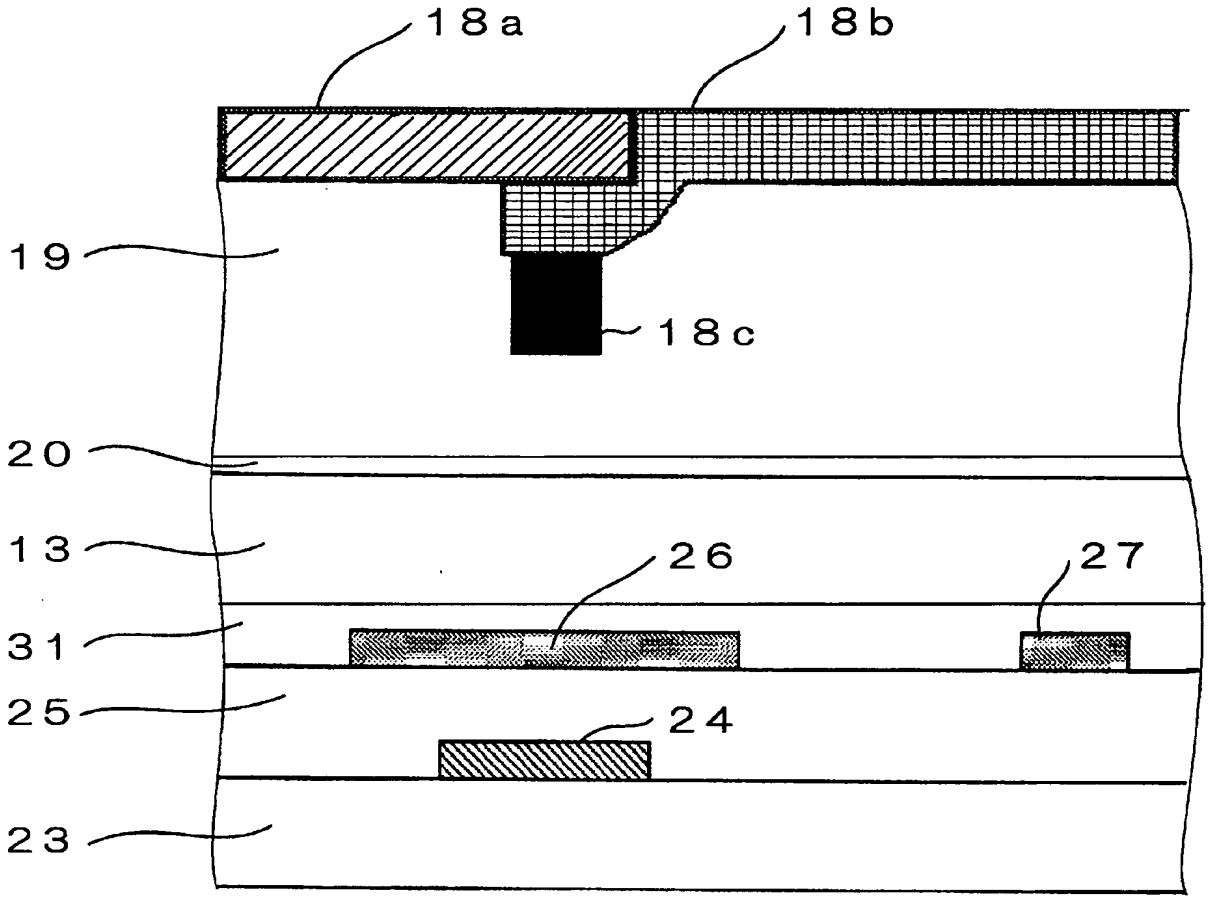


FIG.18

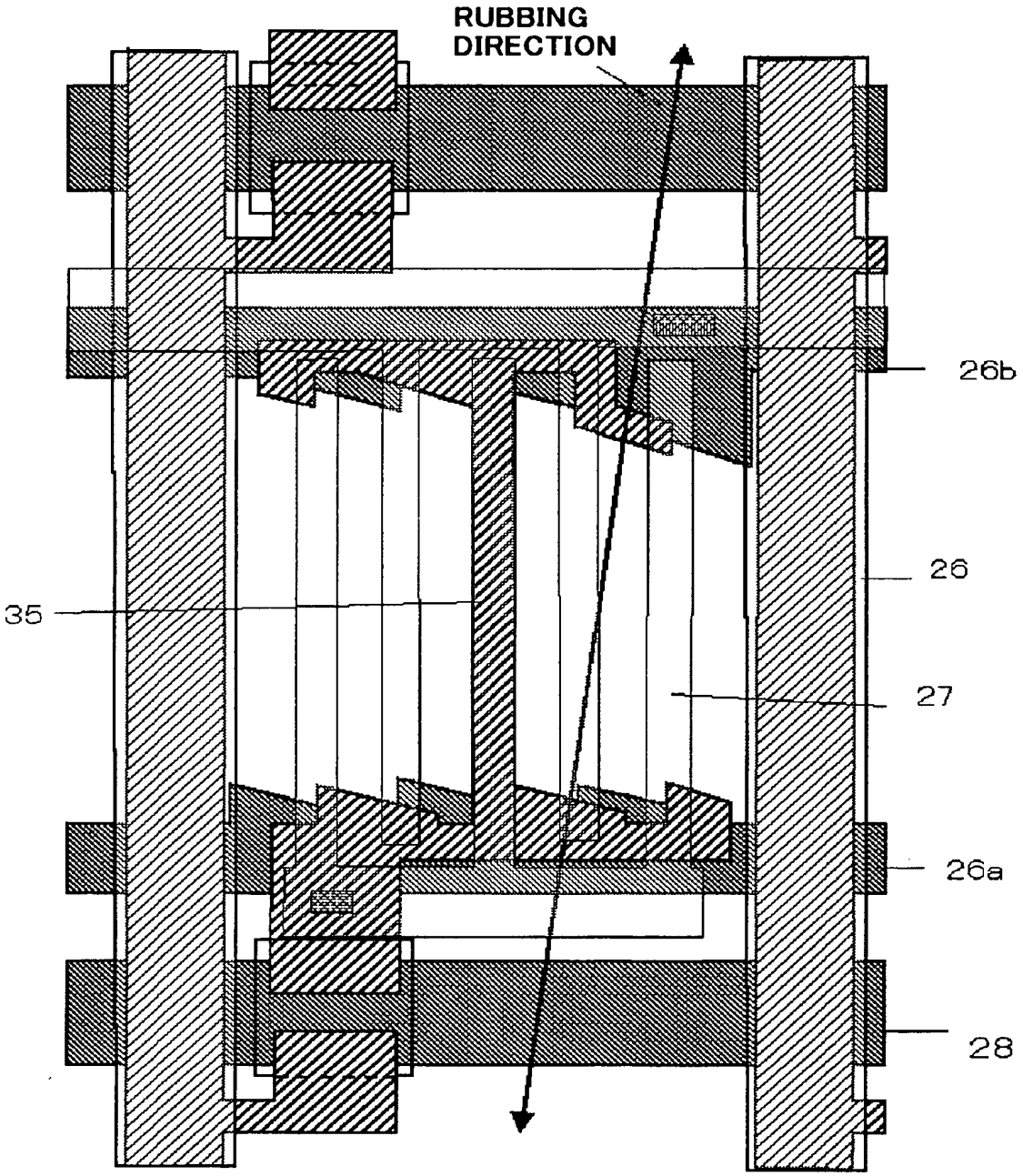


FIG.19A

LAYERS OTHER THAN ITO LAYER

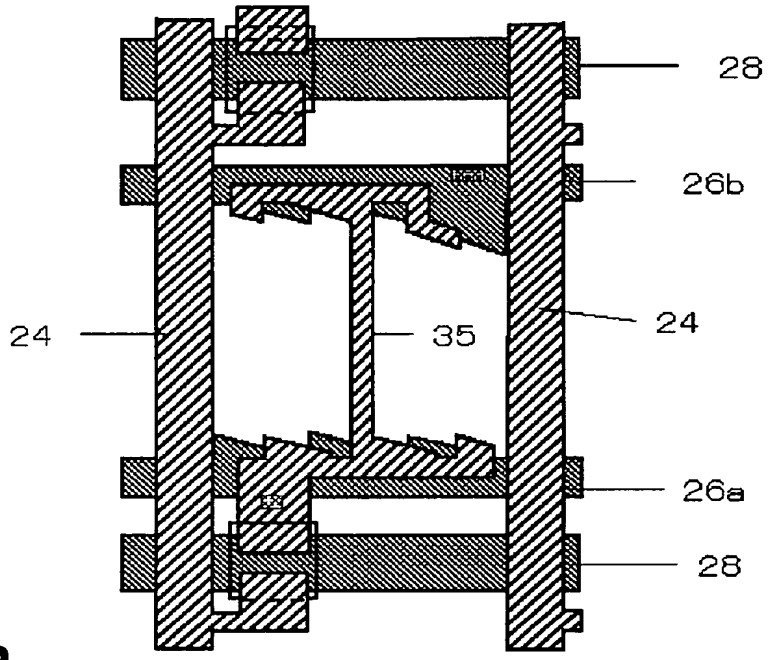


FIG.19B

ITO LAYER

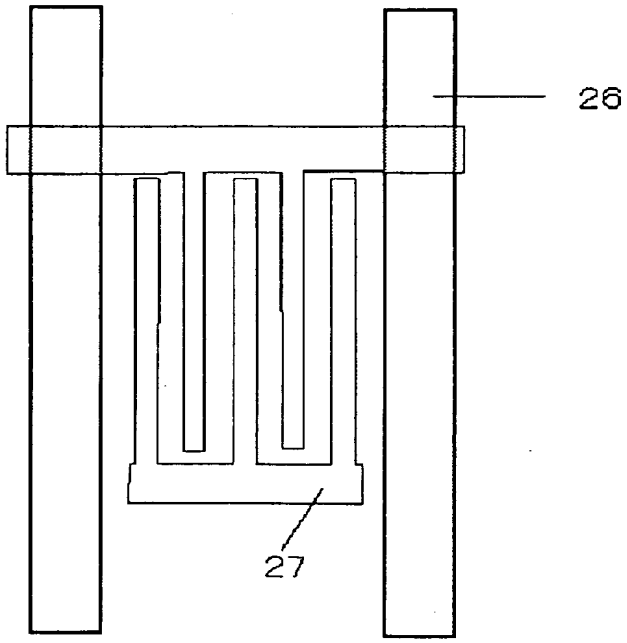


FIG.20

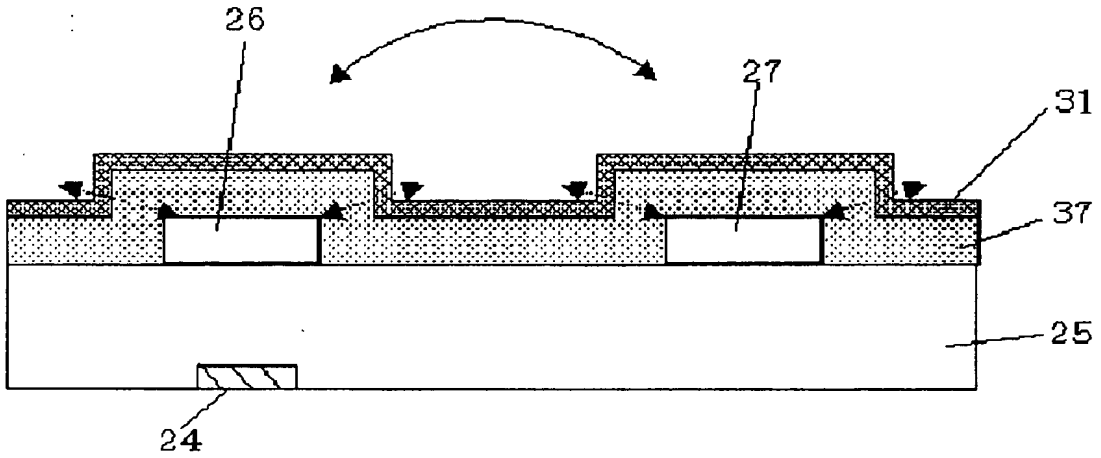


FIG.21

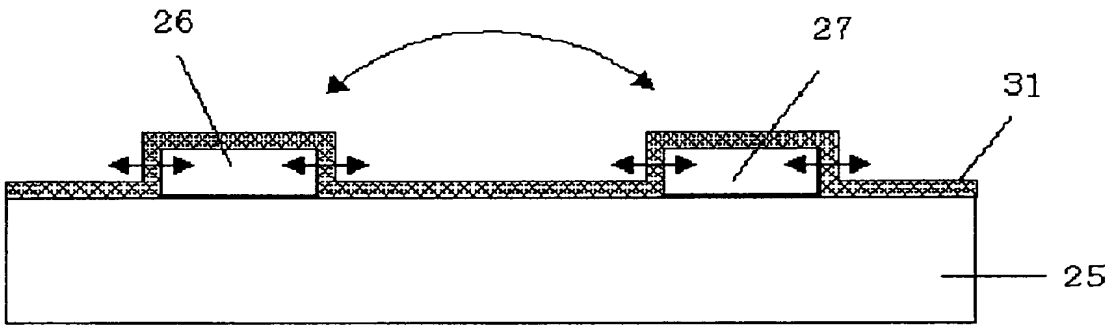


FIG.22

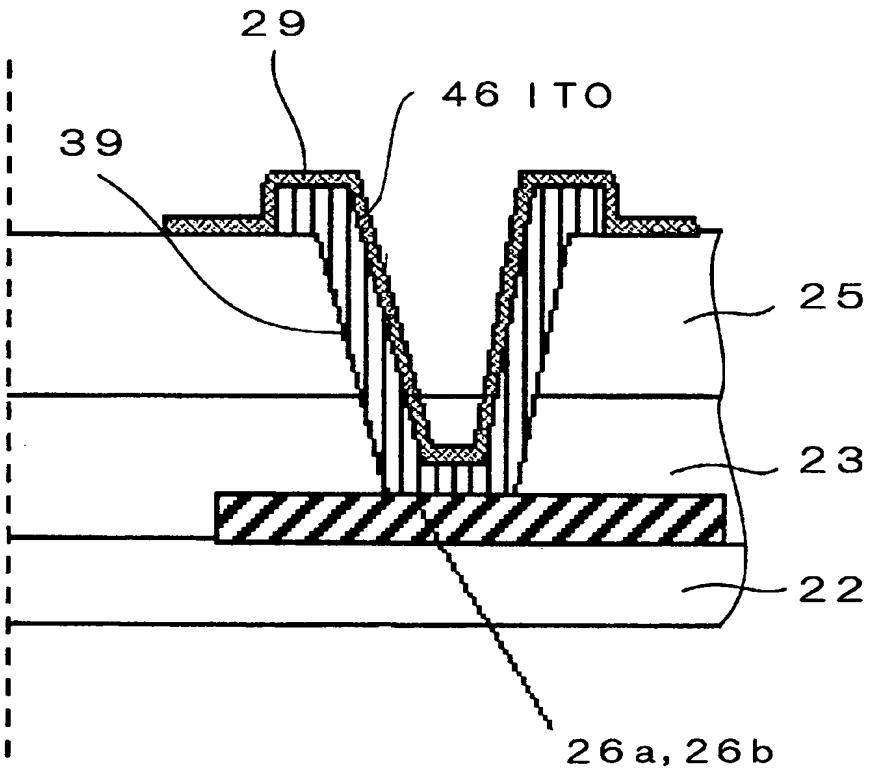


FIG.23

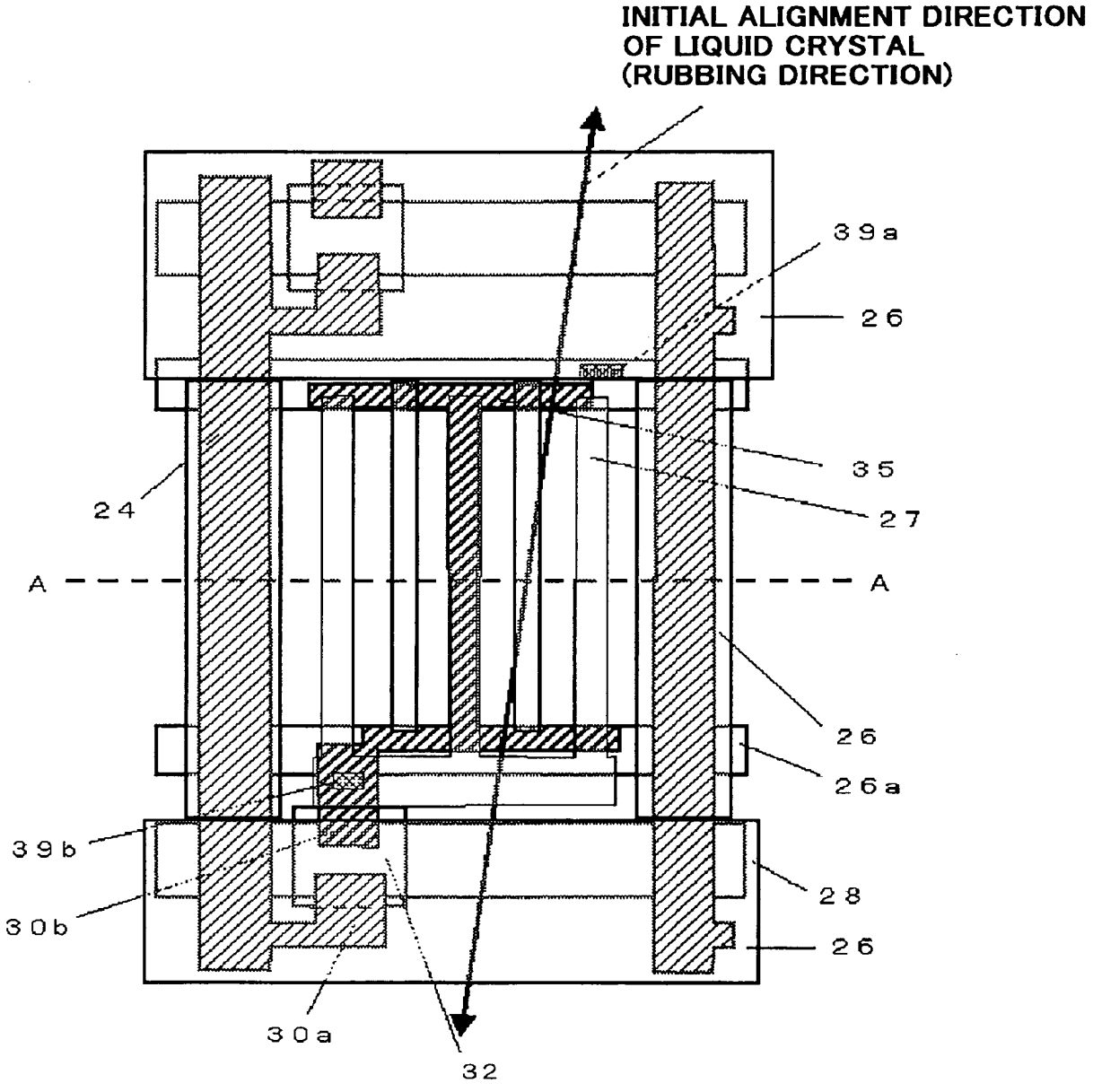

INITIAL ALIGNMENT DIRECTION
OF LIQUID CRYSTAL
(RUBBING DIRECTION)
39a
26
35
27
24
A
A
26
26a
39b
30b
28
26
30a
32

FIG.24

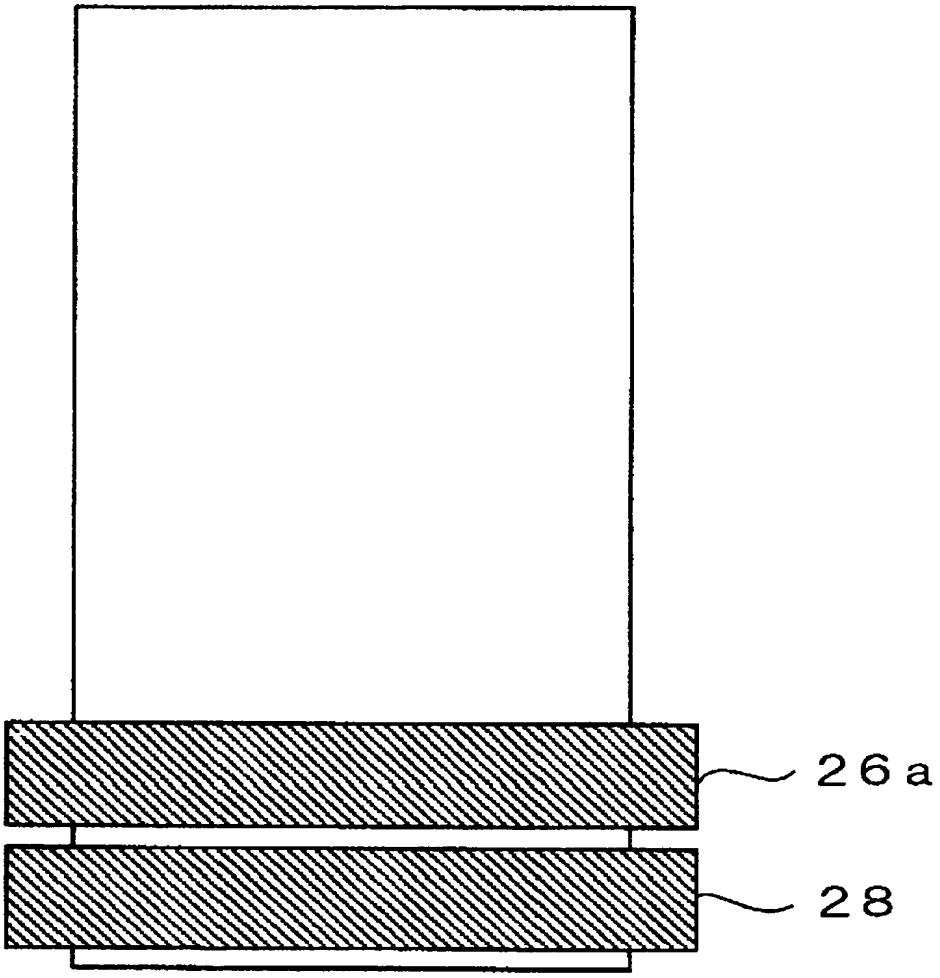


FIG.25

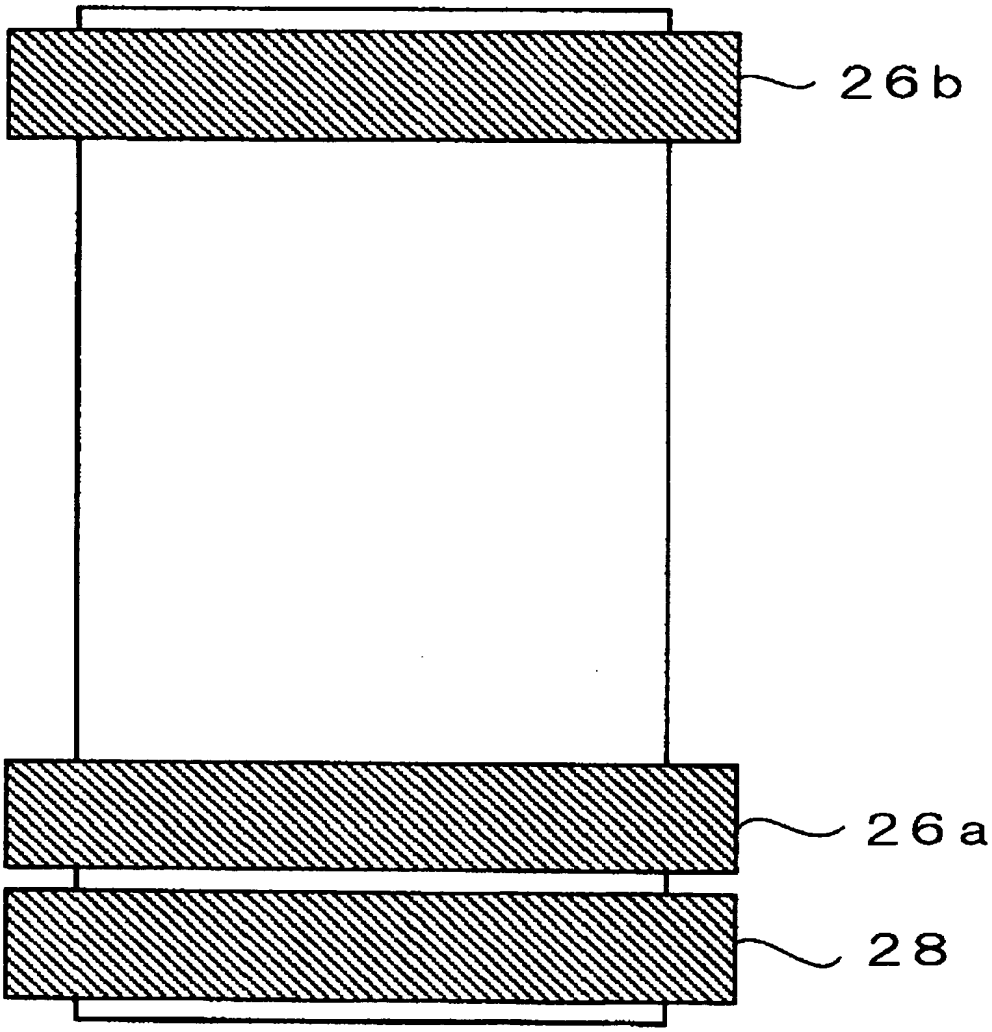


FIG.26

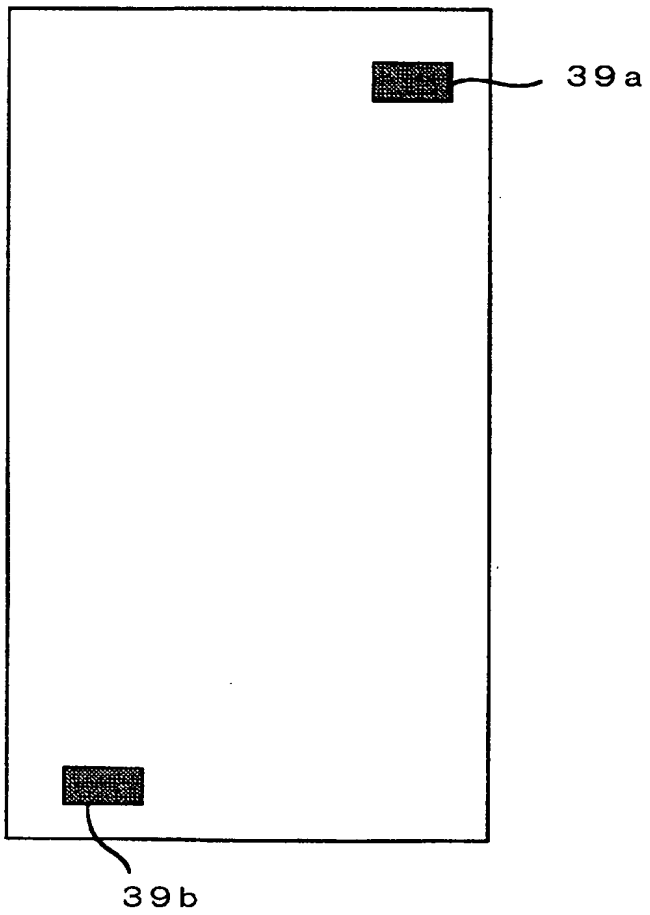


FIG.27

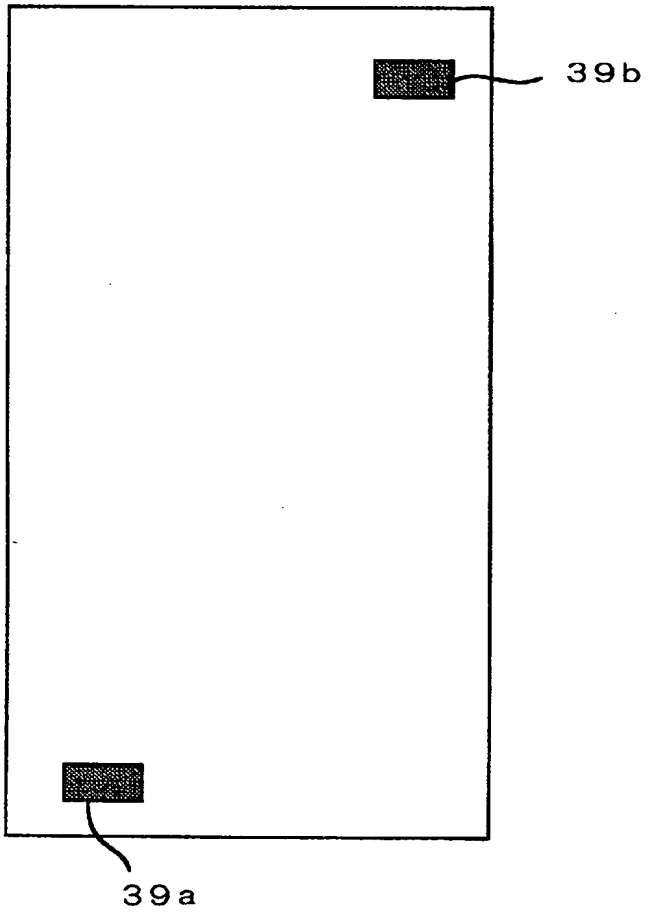


FIG.28A

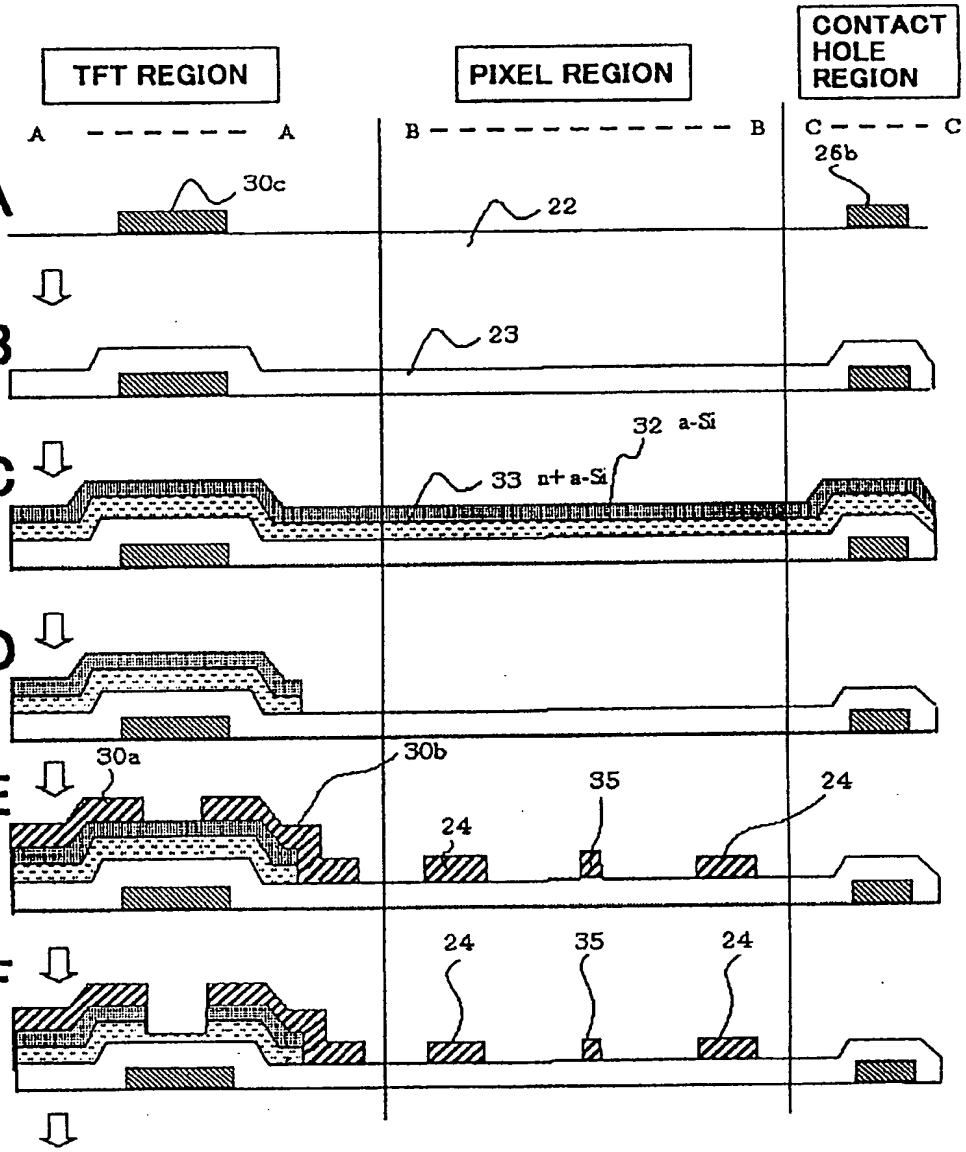


FIG.28B

FIG.28C

FIG.28D

FIG.28E

FIG.28F

FIG.28G

FIG.28H

FIG.28I

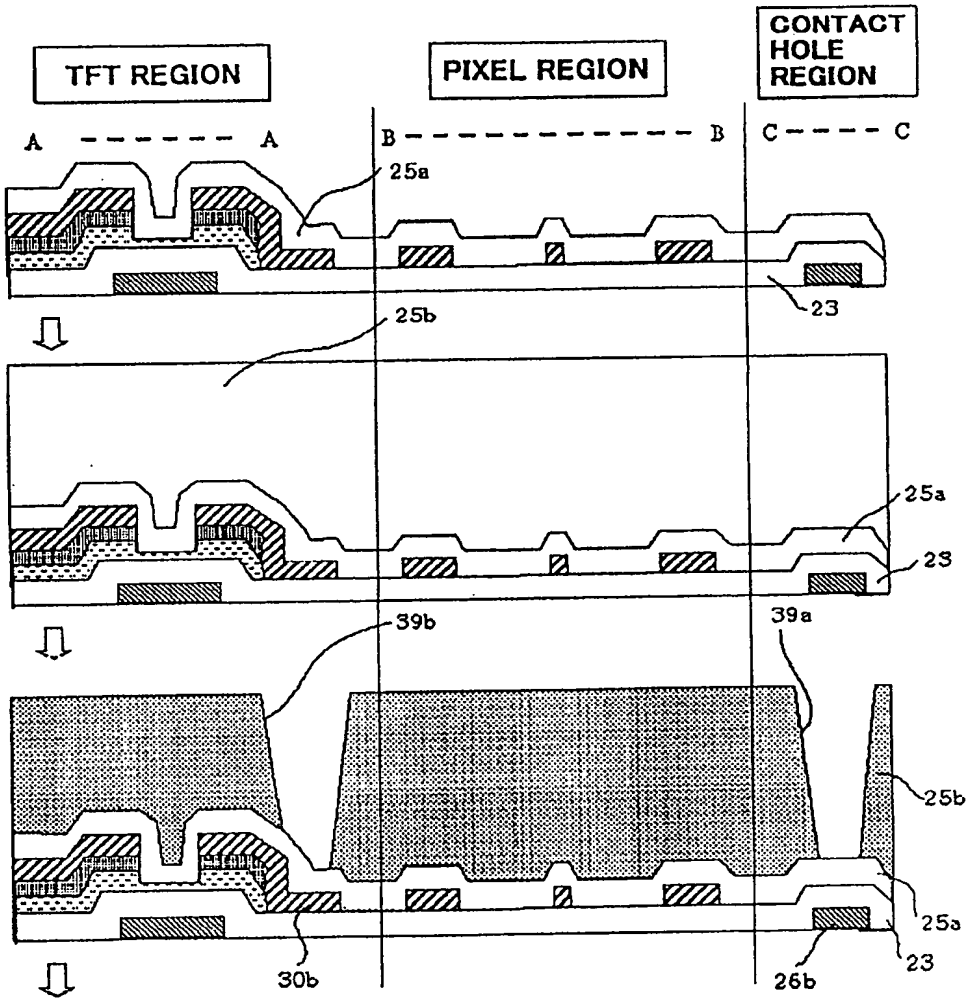


FIG.28J

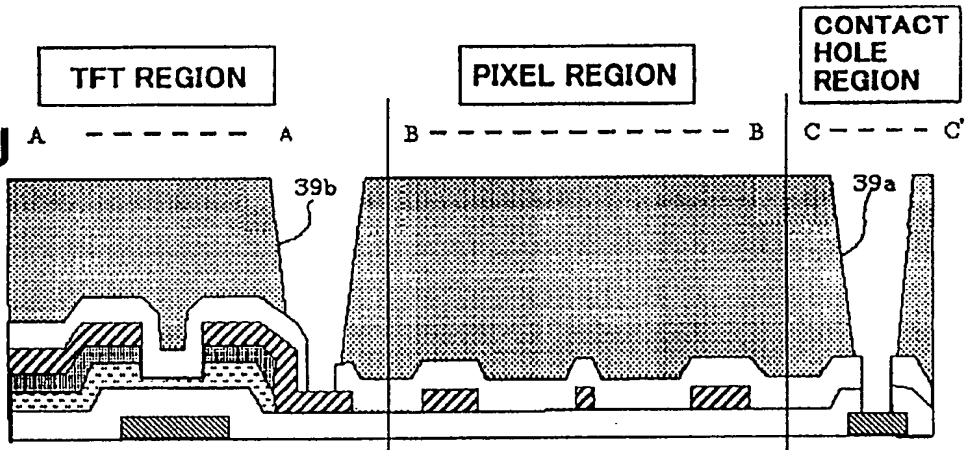


FIG.28K

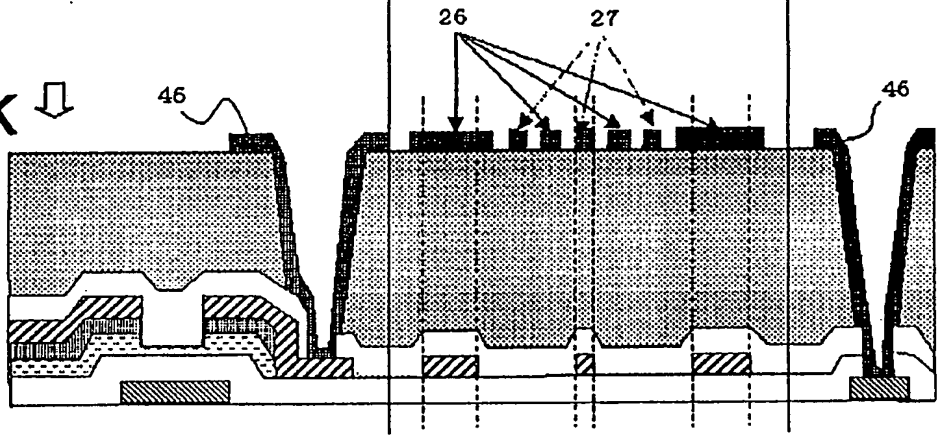


FIG.29A

FIG.29B

FIG.29C

FIG.29D

FIG.29E

FIG.29F

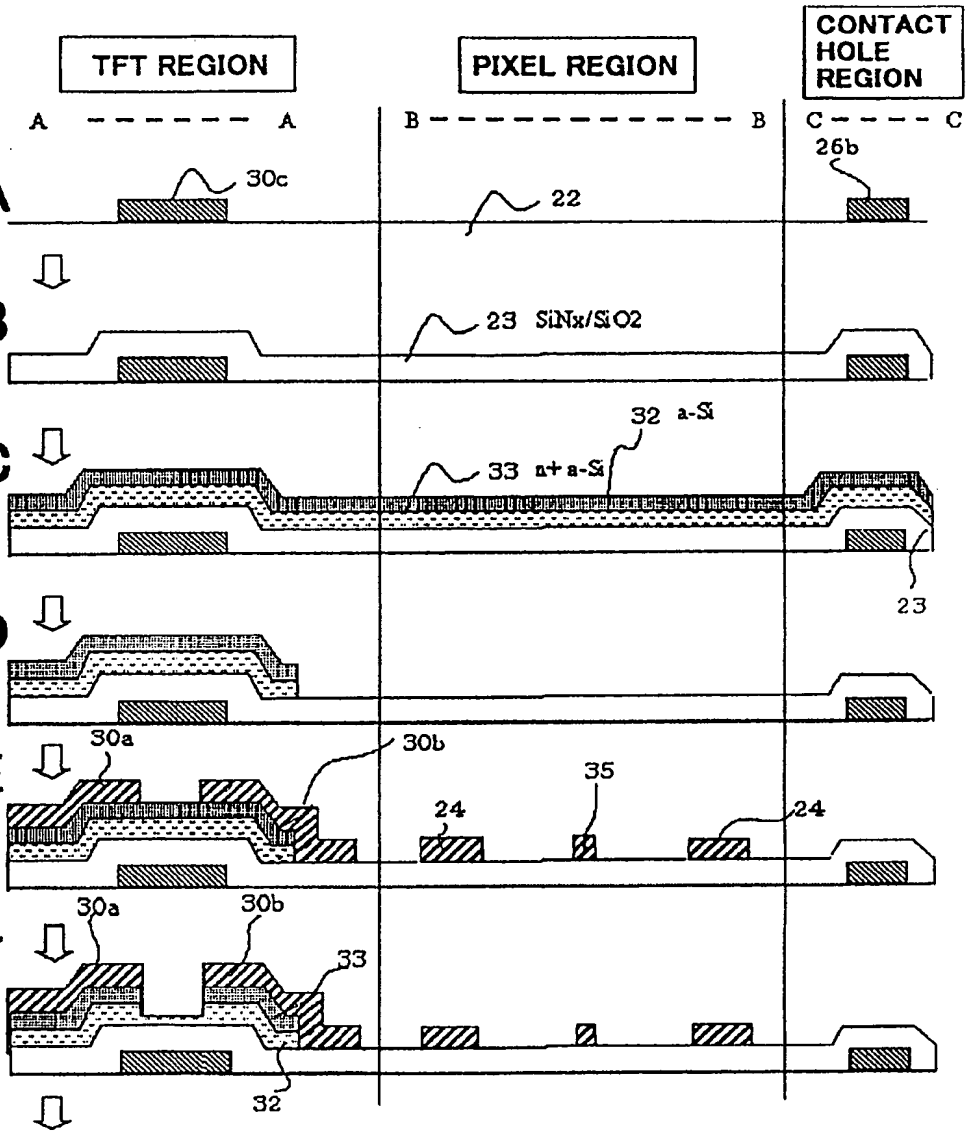


FIG.29G

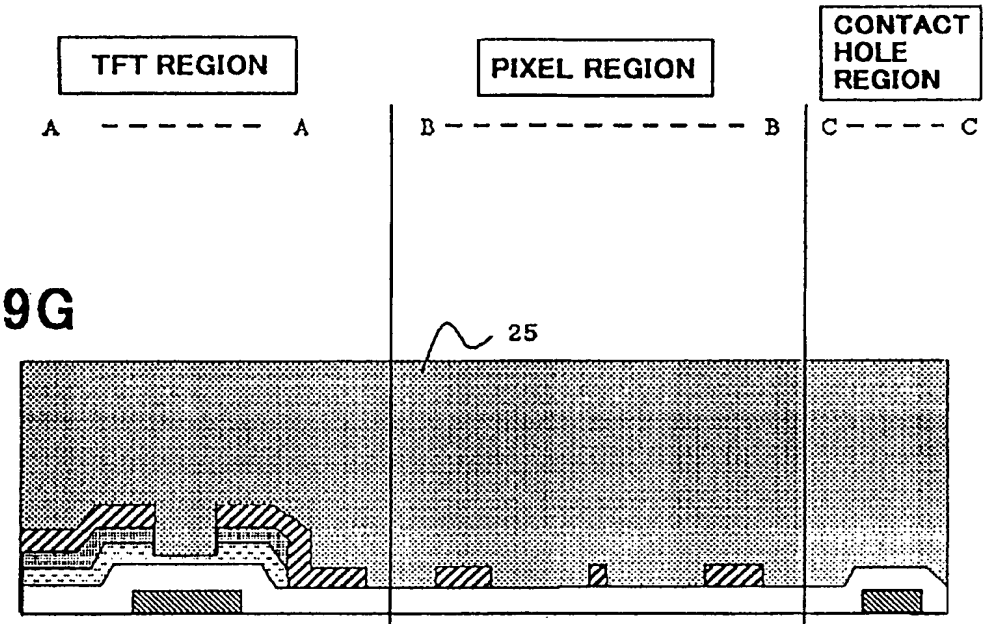


FIG.29H

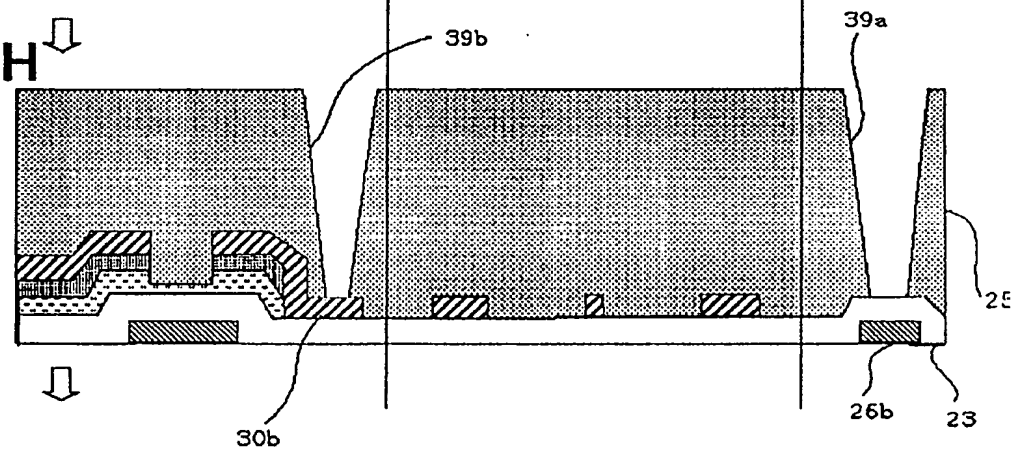


FIG.29I

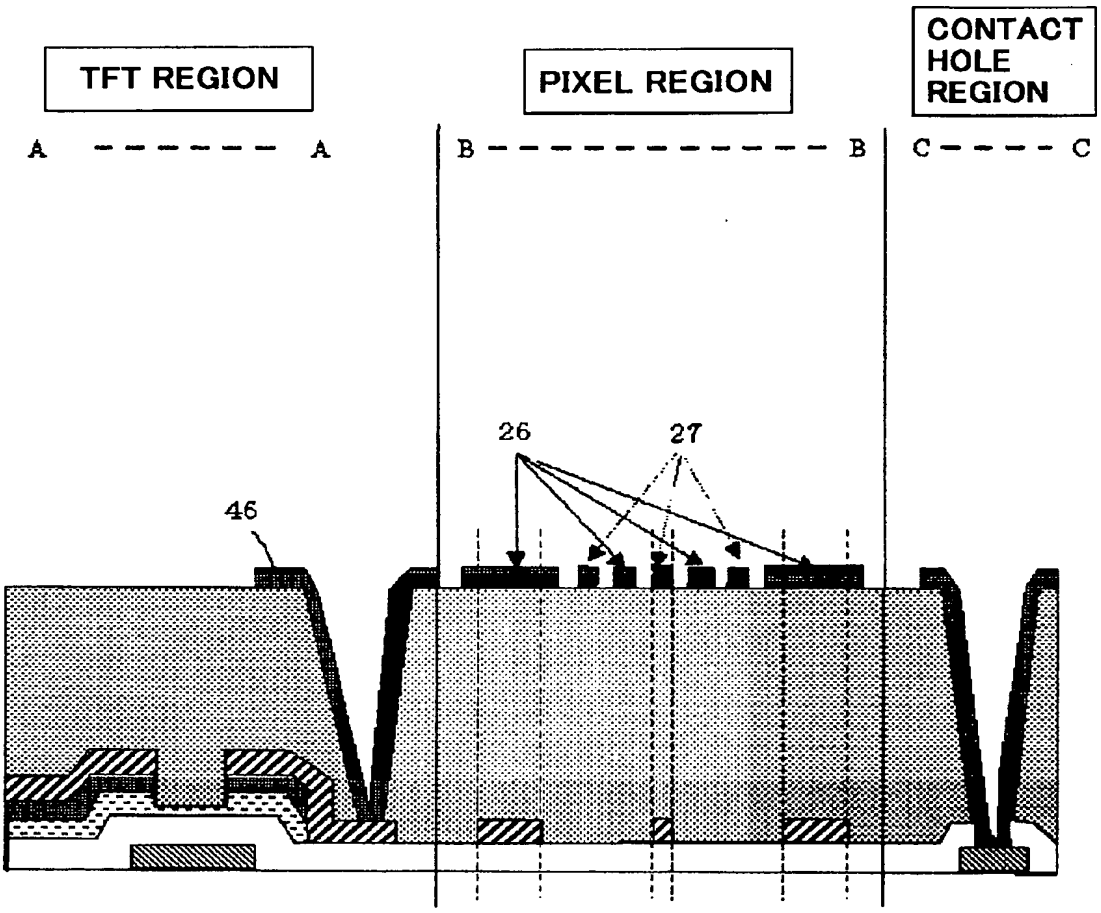


FIG.30A

FIG.30B

FIG.30C

FIG.30D

FIG.30E

FIG.30F

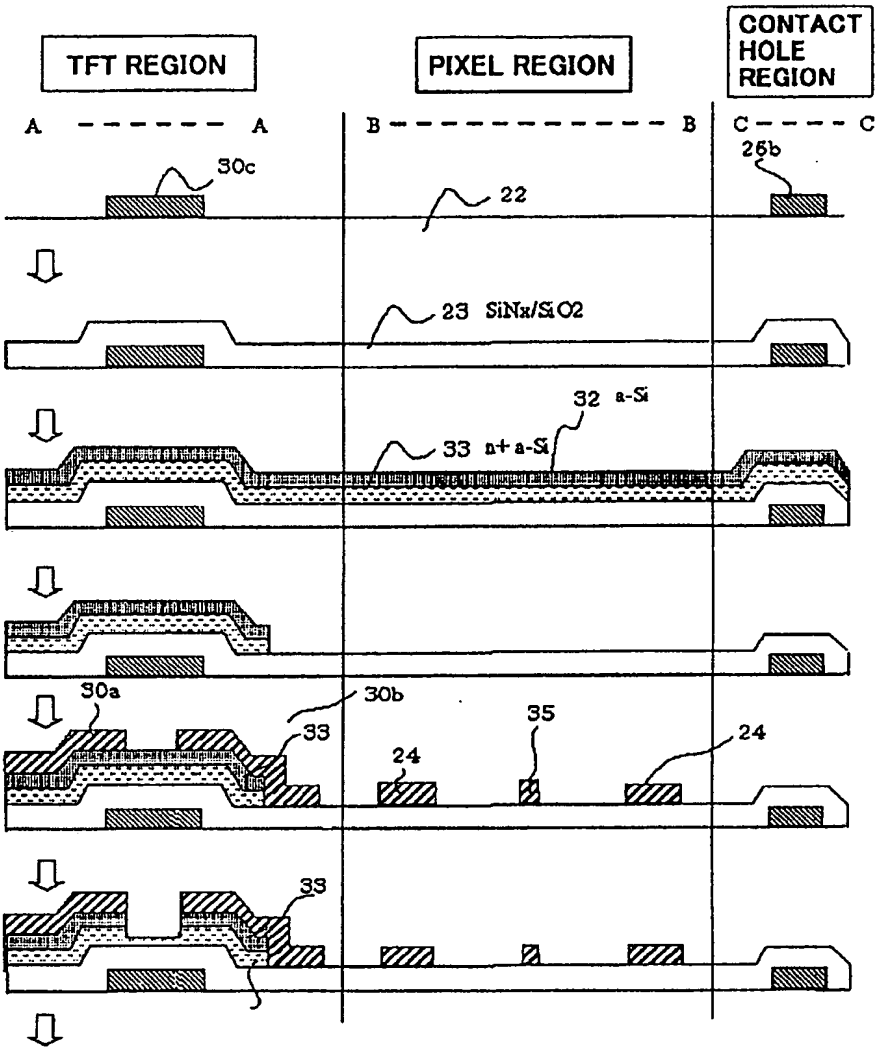


FIG.30G

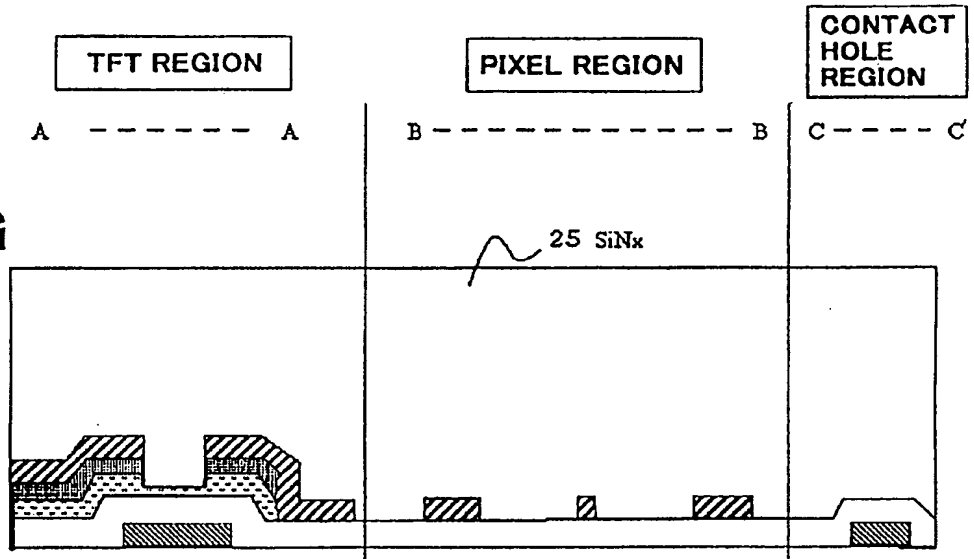


FIG.30H

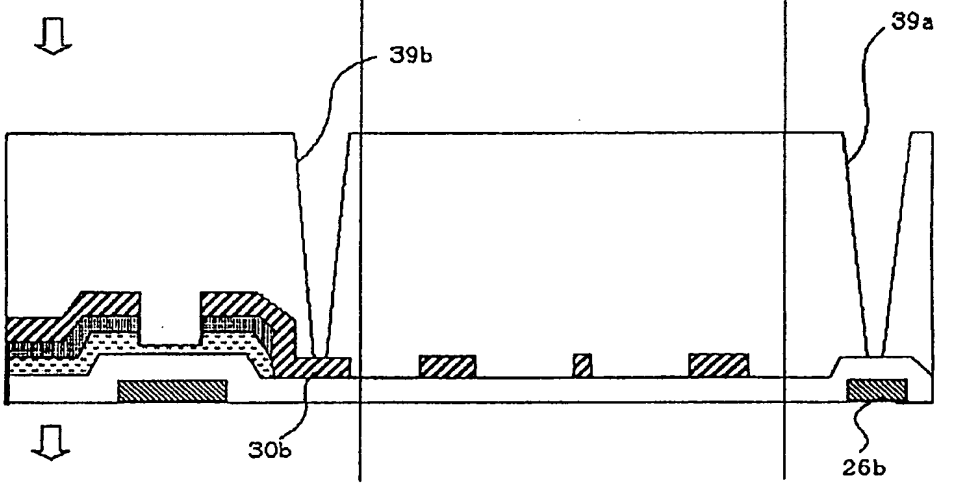


FIG.30I

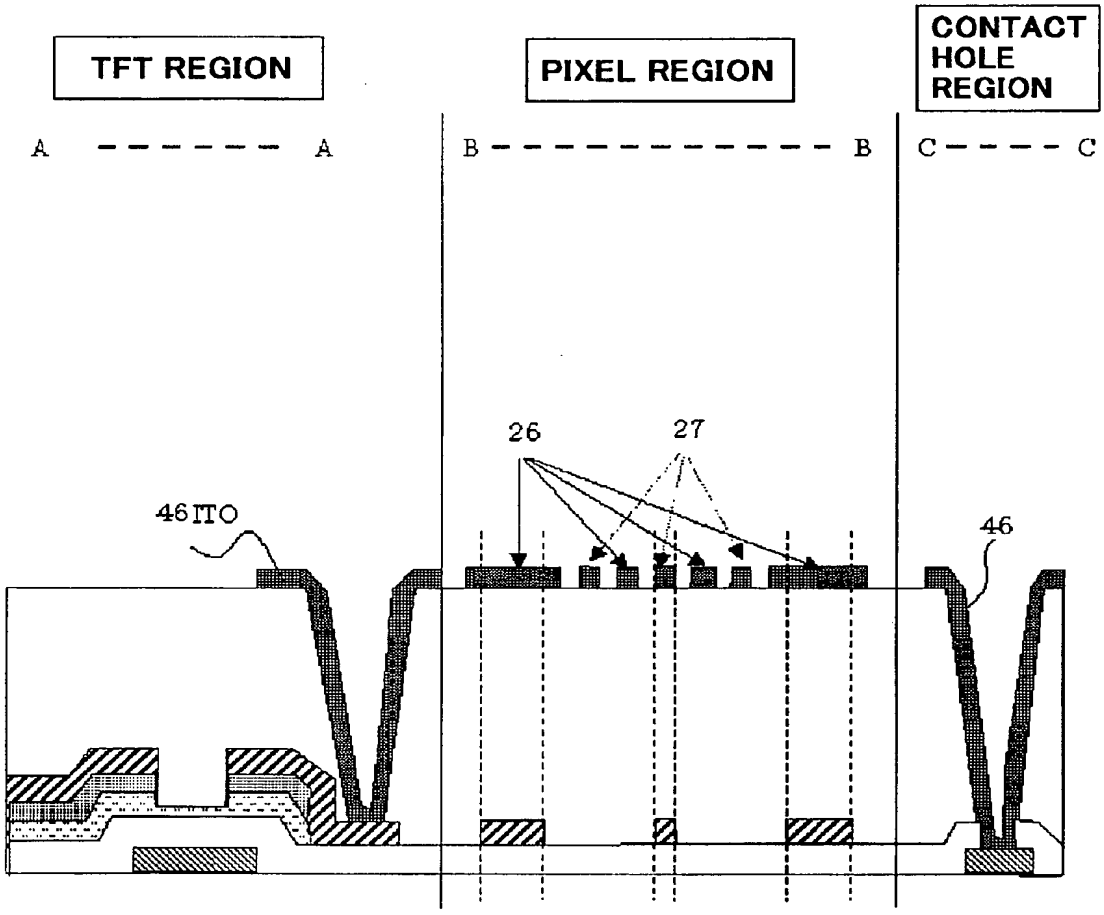

TFT REGION
PIXEL REGION
CONTACT HOLE REGION
A
A
B
B
C
C
26
27
46ITO
46

FIG.31

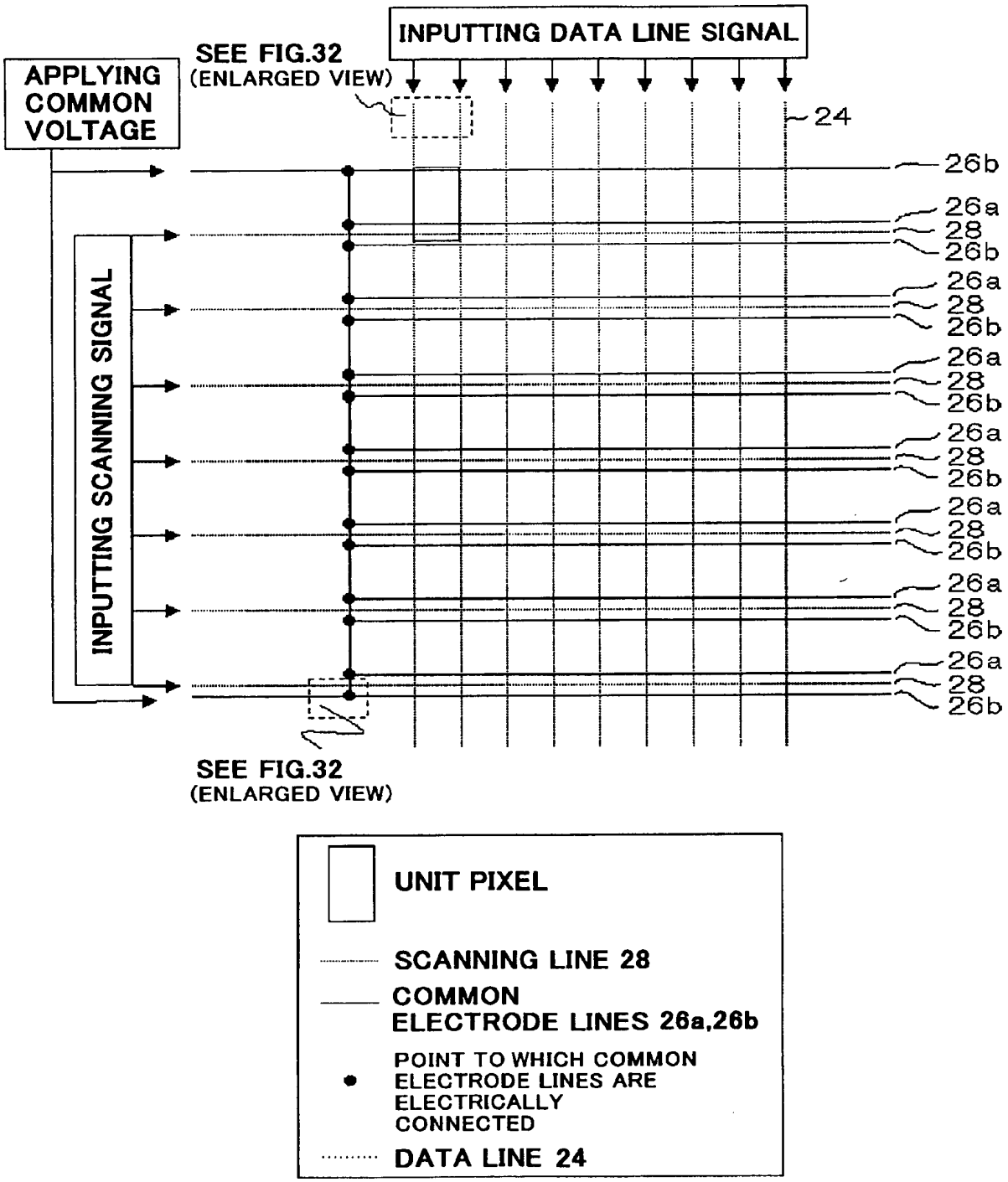

INPUTTING DATA LINE SIGNAL
SEE FIG.32
(ENLARGED VIEW)
APPLYING COMMON VOLTAGE
INPUTTING SCANNING SIGNAL
24
26b
26a
28
SEE FIG.32
(ENLARGED VIEW)
UNIT PIXEL
SCANNING LINE 28
COMMON ELECTRODE LINES 26a,26b
POINT TO WHICH COMMON ELECTRODE LINES ARE ELECTRICALLY CONNECTED
DATA LINE 24

FIG.32

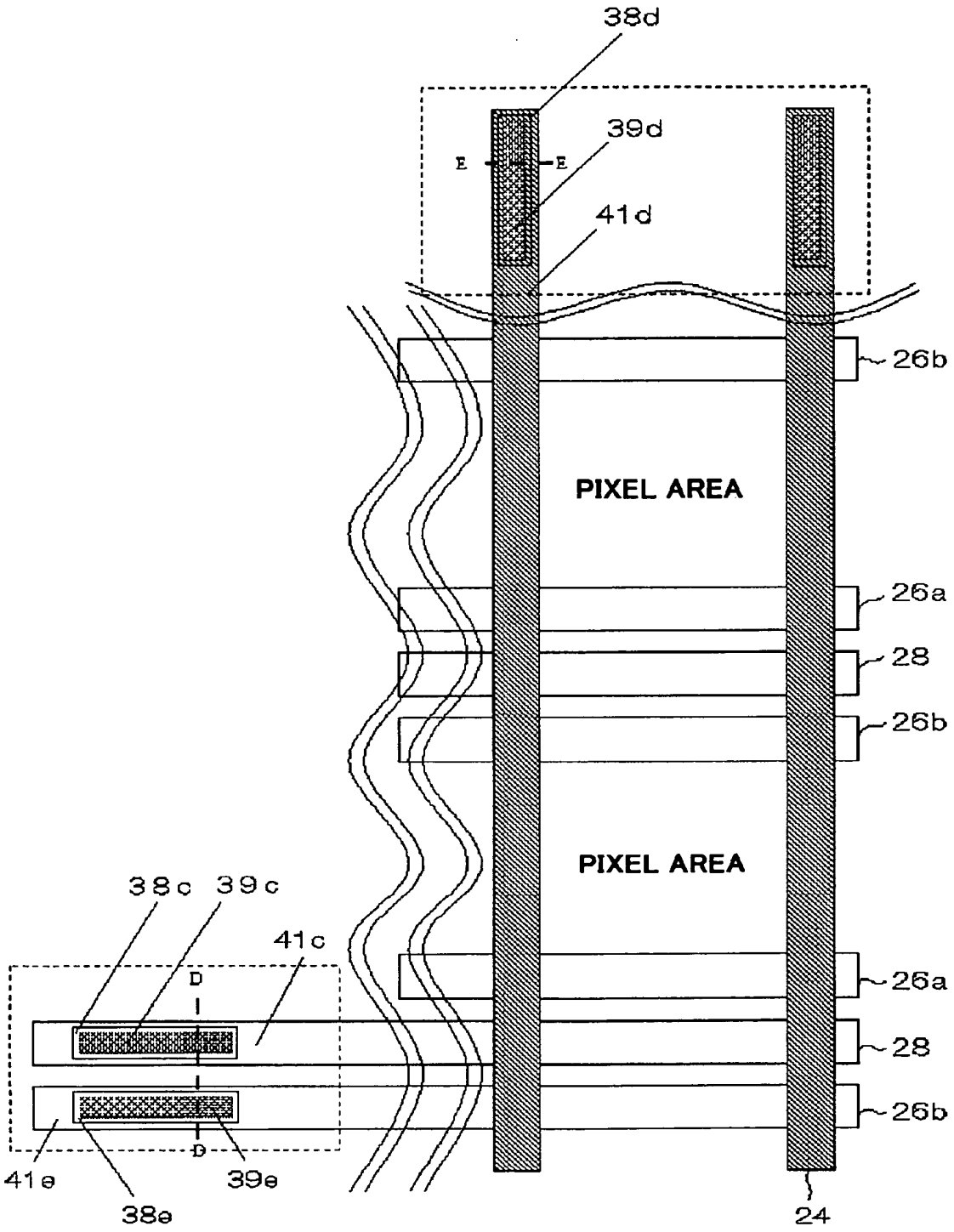

38d
39d
E
E
41d
26b
PIXEL AREA
26a
28
26b
PIXEL AREA
38c
39c
41c
D
D
26a
28
26b
41e
38e
39e
24

FIG.33A

FIG.33B

FIG.33C

FIG.33D

FIG.33E

FIG.33F

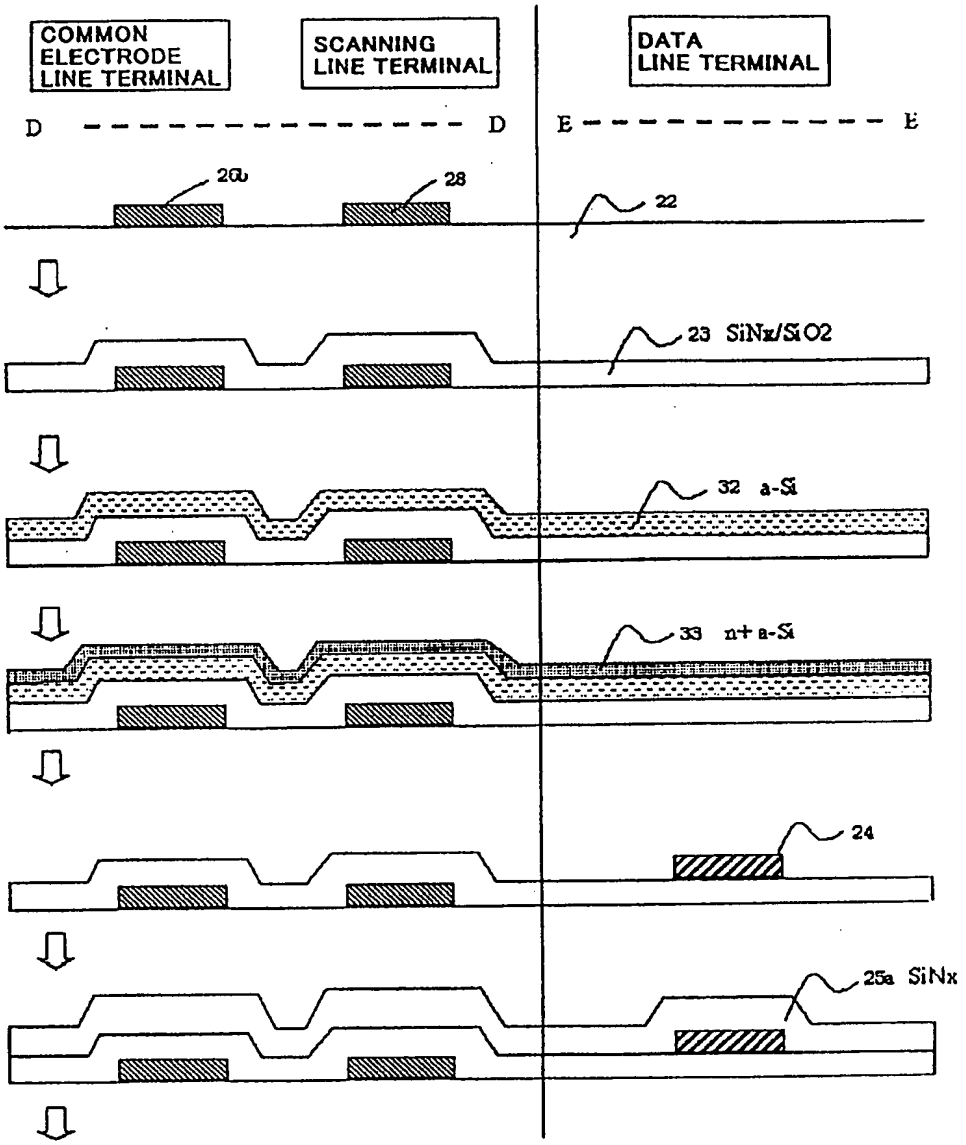


FIG.33G

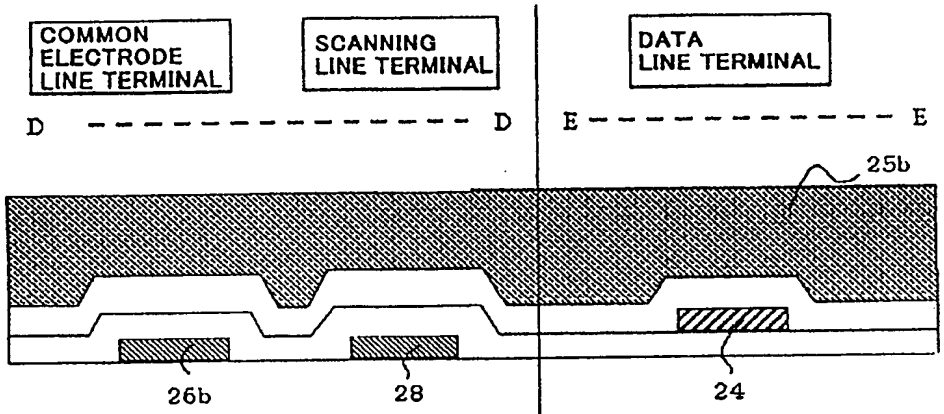


FIG.33H

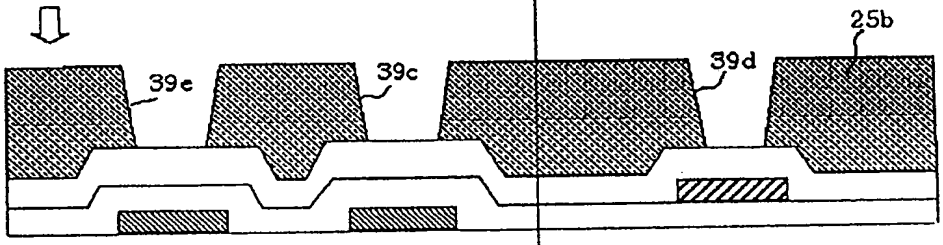


FIG.33I

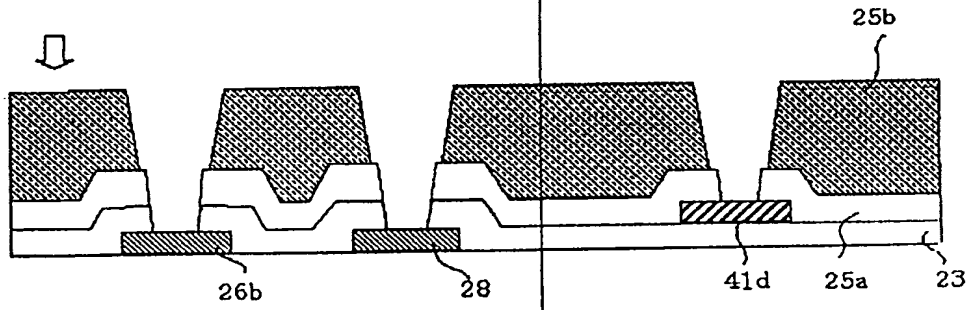


FIG.33J

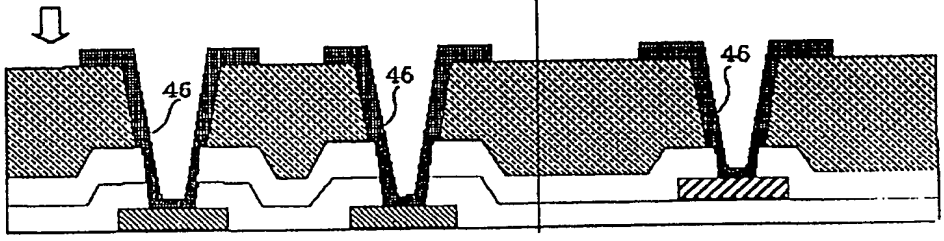


FIG.34A

FIG.34B

FIG.34C

FIG.34D

FIG.34E

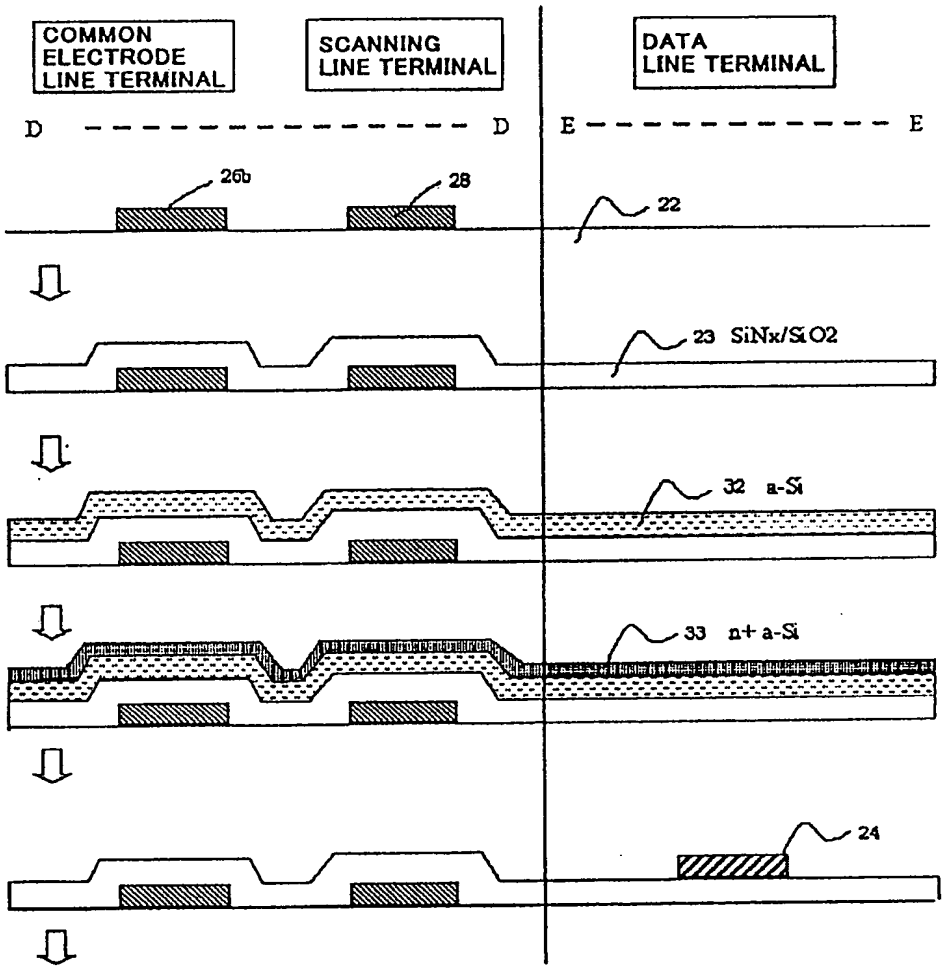


FIG.34F

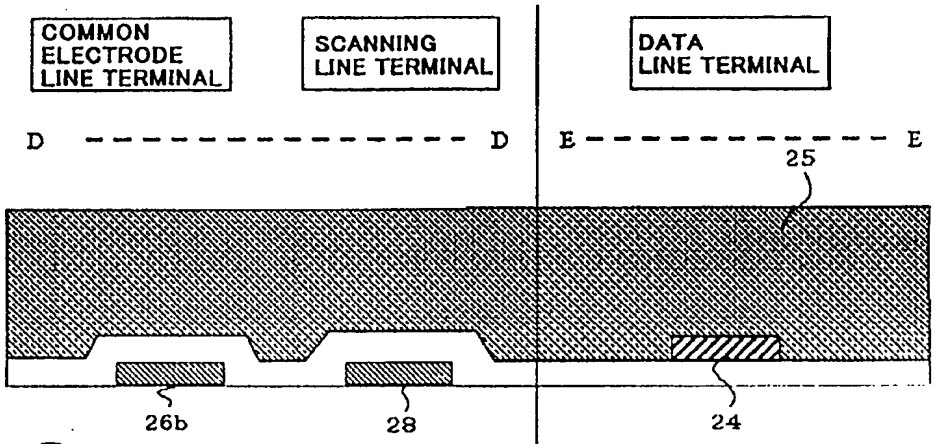


FIG.34G

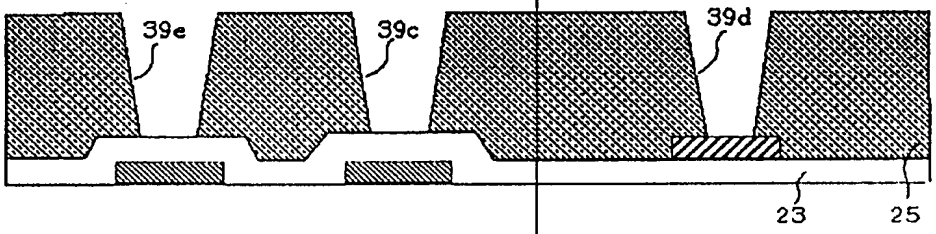


FIG.34H

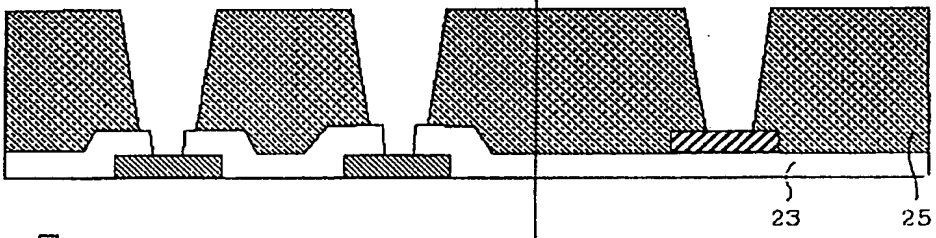


FIG.34I

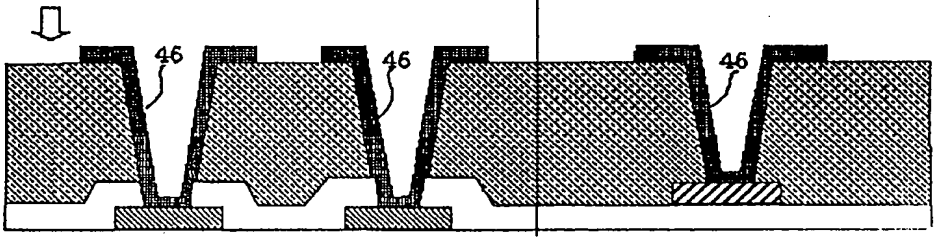


FIG.35A

FIG.35B

FIG.35C

FIG.35D

FIG.35E

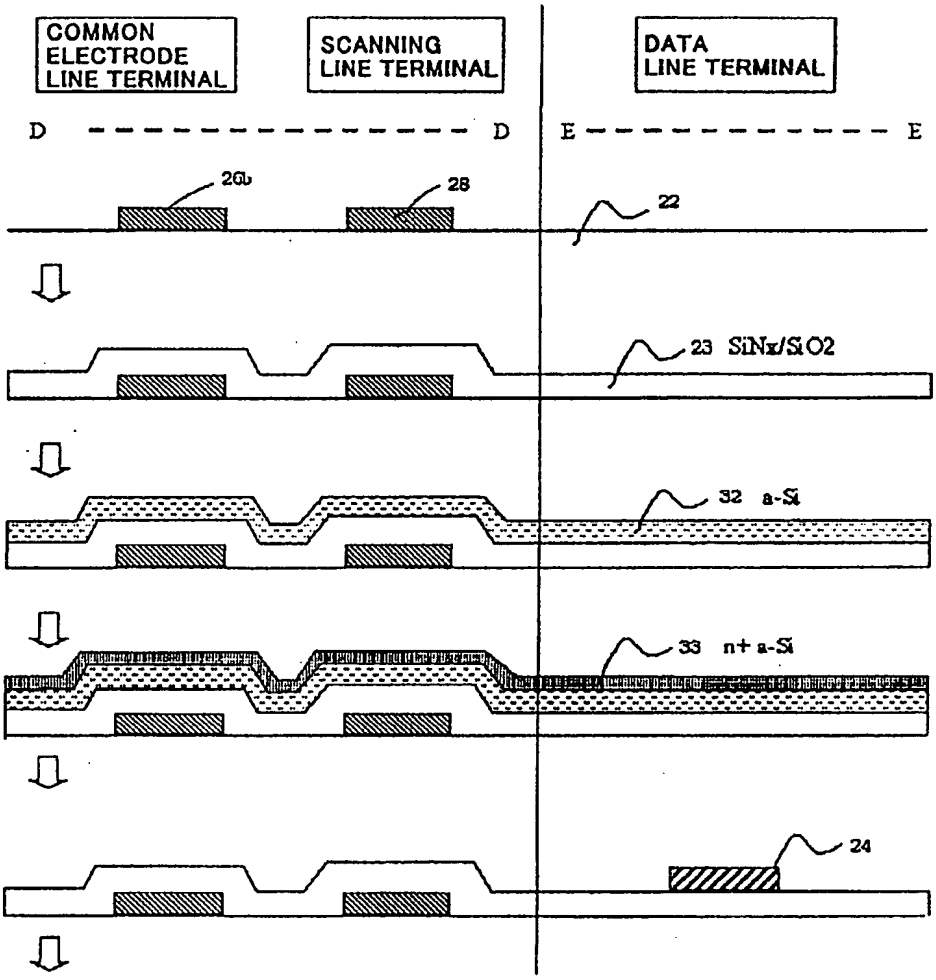


FIG.35F

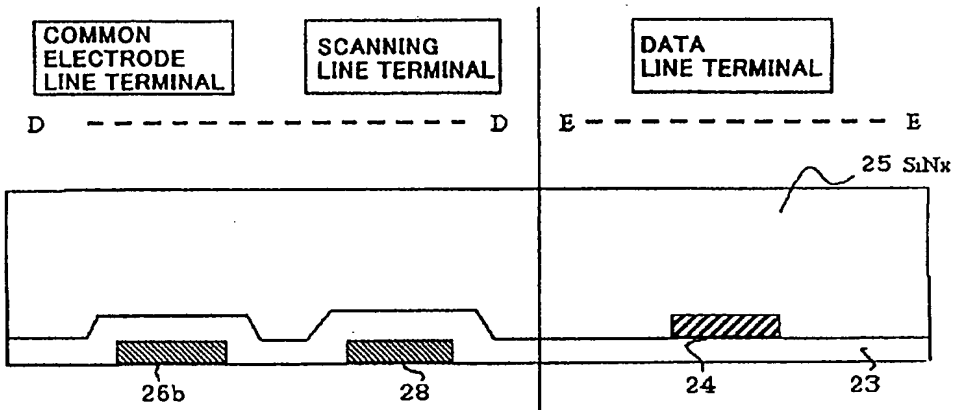


FIG.35G

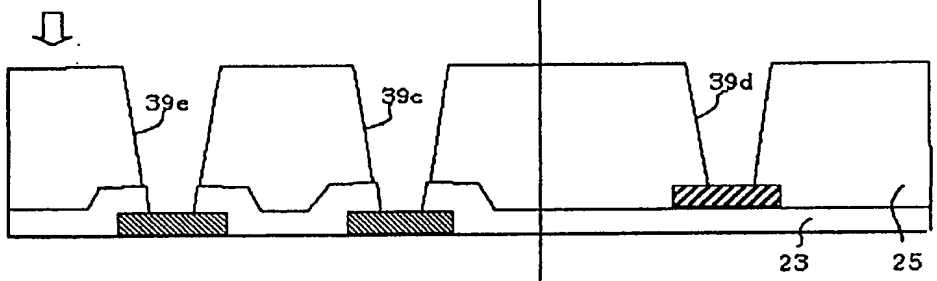


FIG.35H

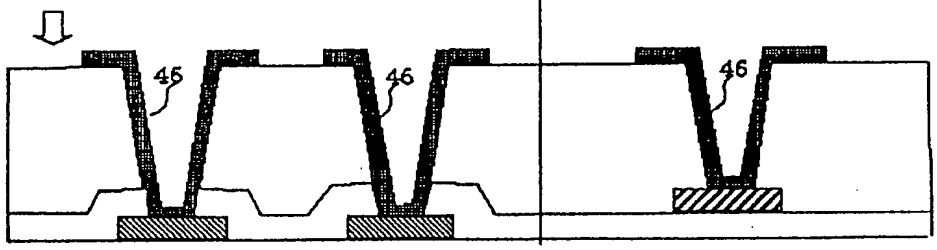


FIG.36

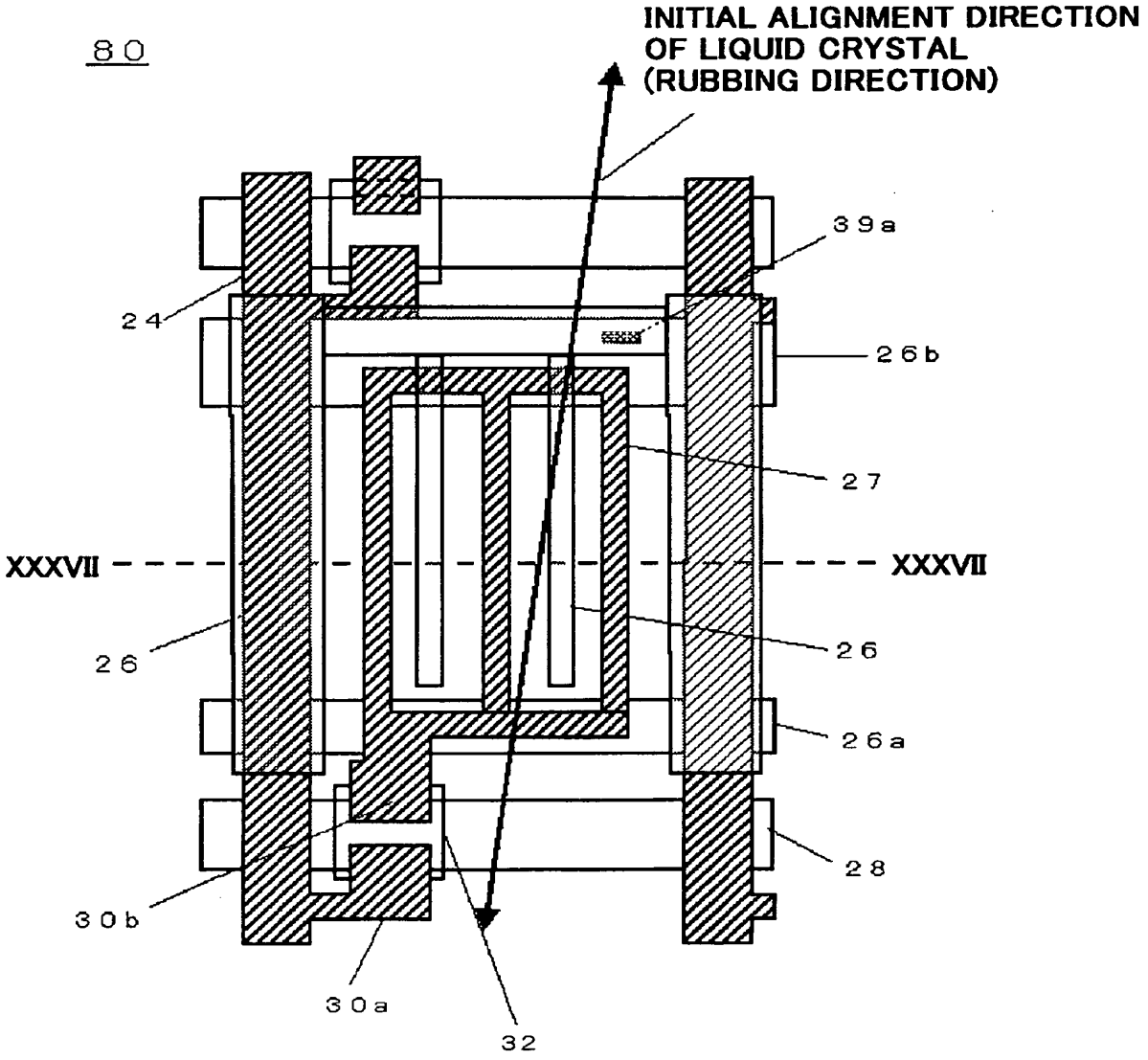

80
INITIAL ALIGNMENT DIRECTION
OF LIQUID CRYSTAL
(RUBBING DIRECTION)
39a
24
26b
27
XXXVII
XXXVII
26
26
26a
28
30b
30a
32

FIG.37

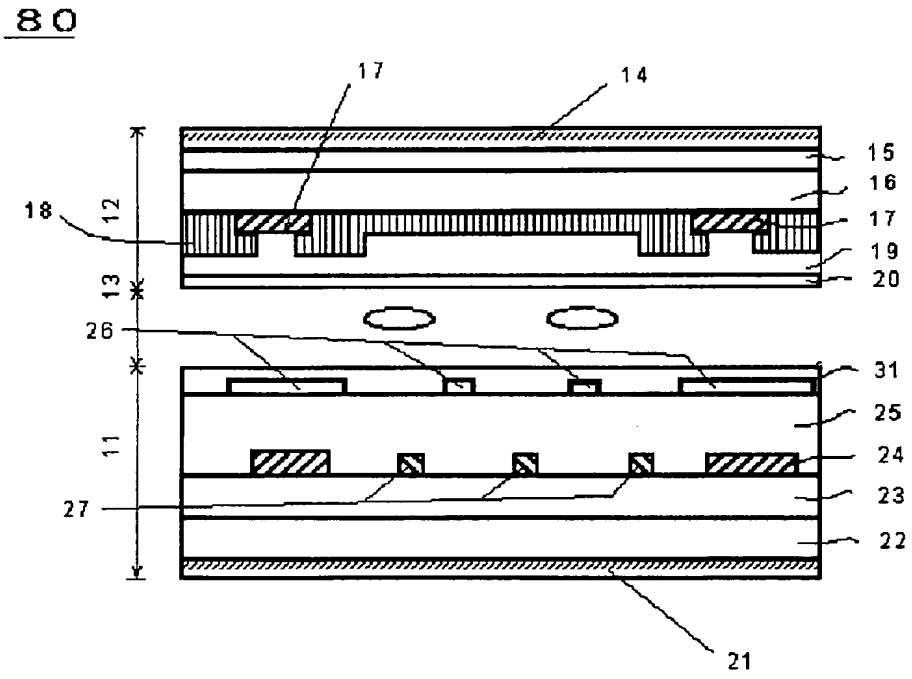


FIG.38

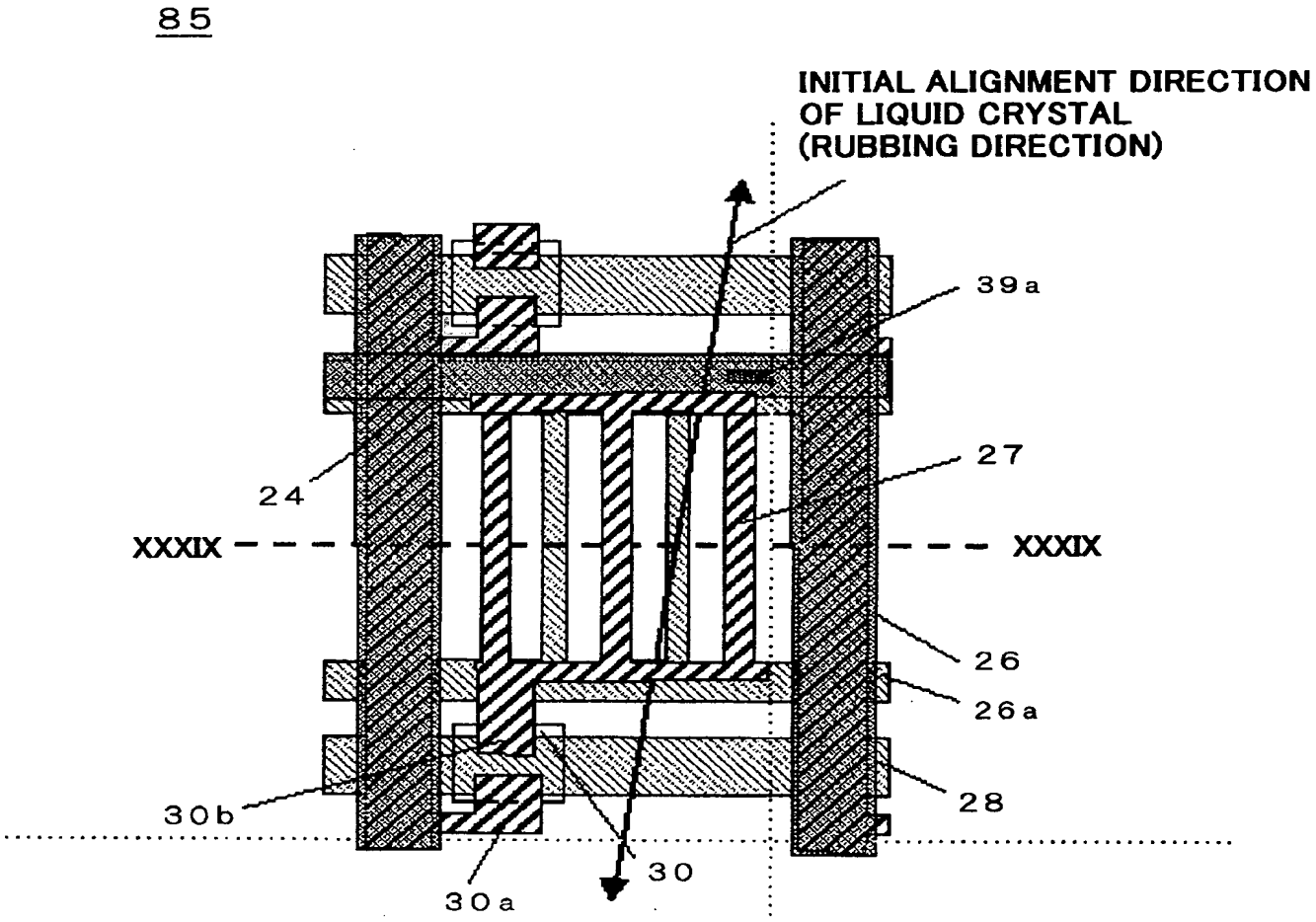

85
INITIAL ALIGNMENT DIRECTION
OF LIQUID CRYSTAL
(RUBBING DIRECTION)
39a
27
24
XXXIX
XXXIX
26
26a
28
30b
30
30a

FIG.39

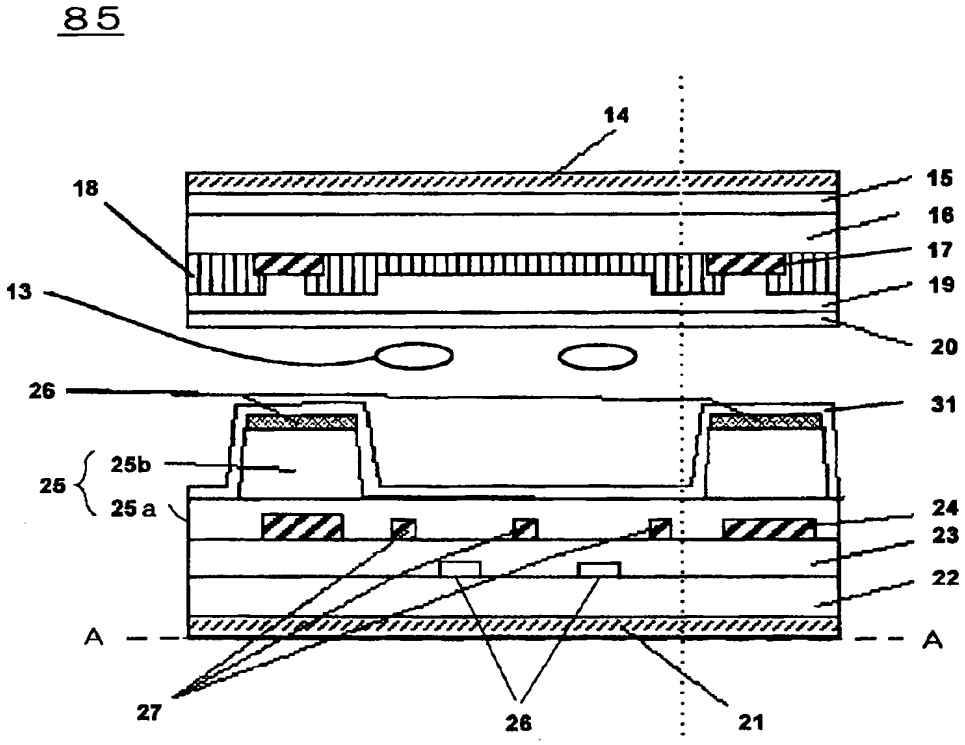


FIG.40

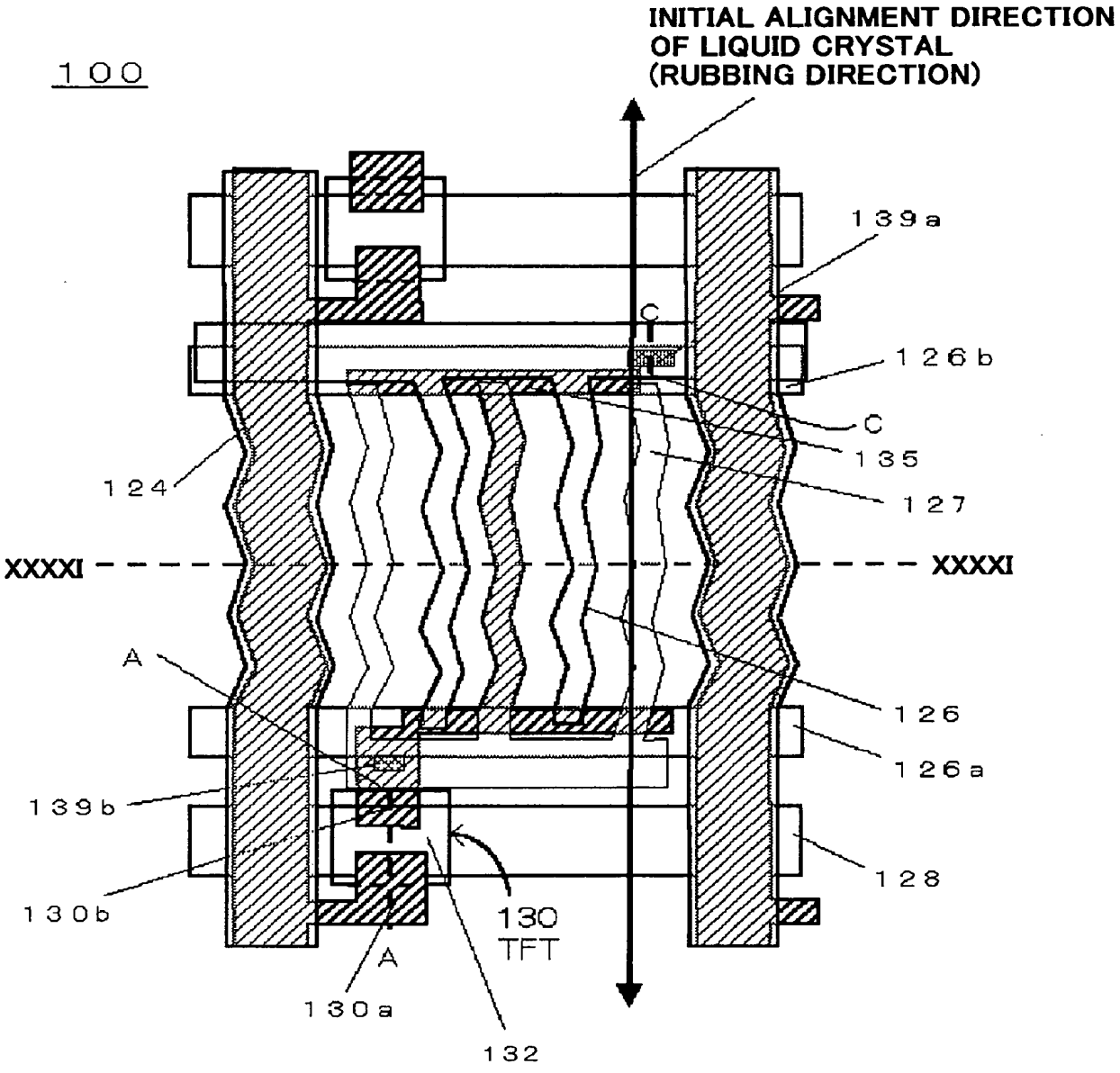

INITIAL ALIGNMENT DIRECTION
OF LIQUID CRYSTAL
(RUBBING DIRECTION)
100
139a
C
126b
C
135
124
127
XXXXI
XXXXI
A
126
126a
139b
128
130b
130
TFT
A
130a
132

FIG.41

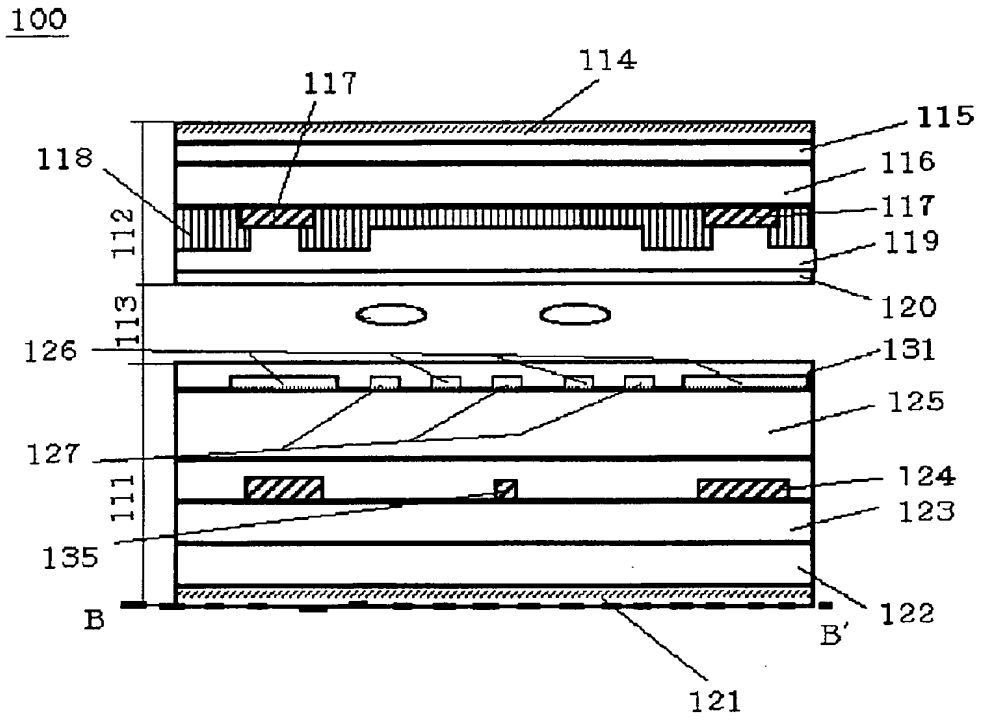

100
114
117
115
118
116
112
117
119
120
113
126
131
125
127
124
111
123
135
122
B
B'
121

FIG.42A

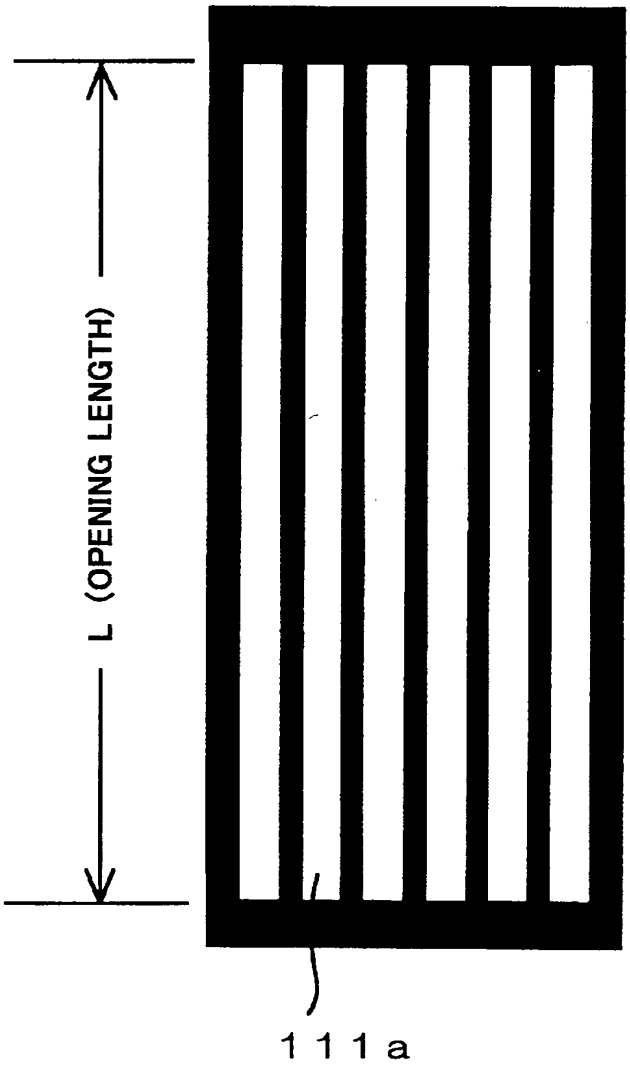


FIG.42B

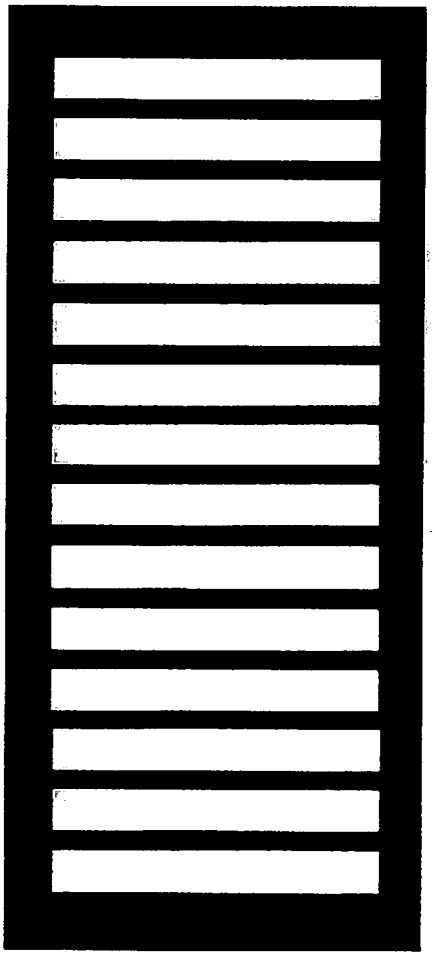


FIG.43A

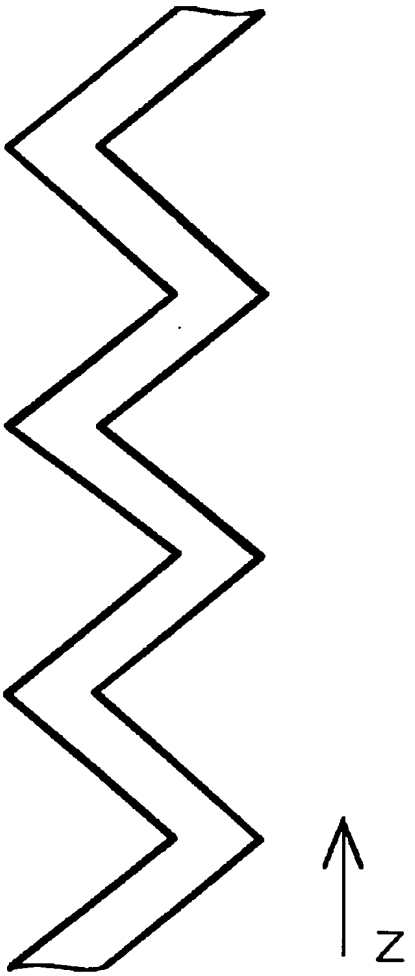


FIG.43B

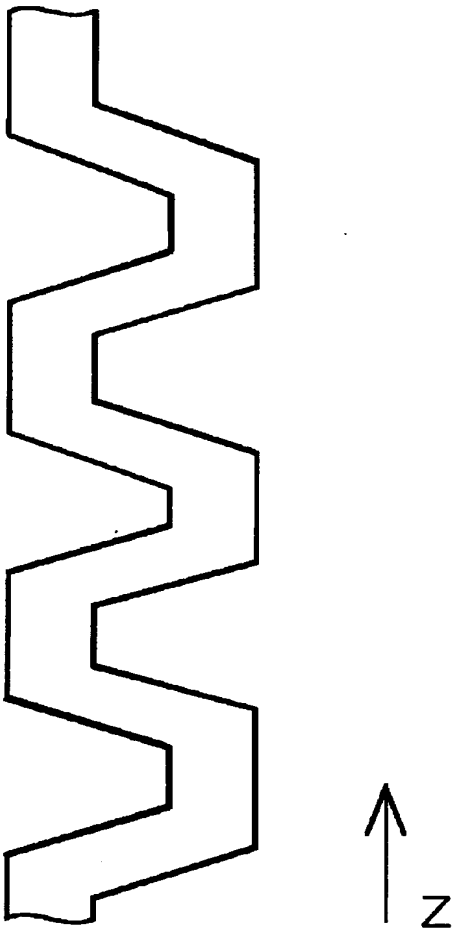


FIG.44

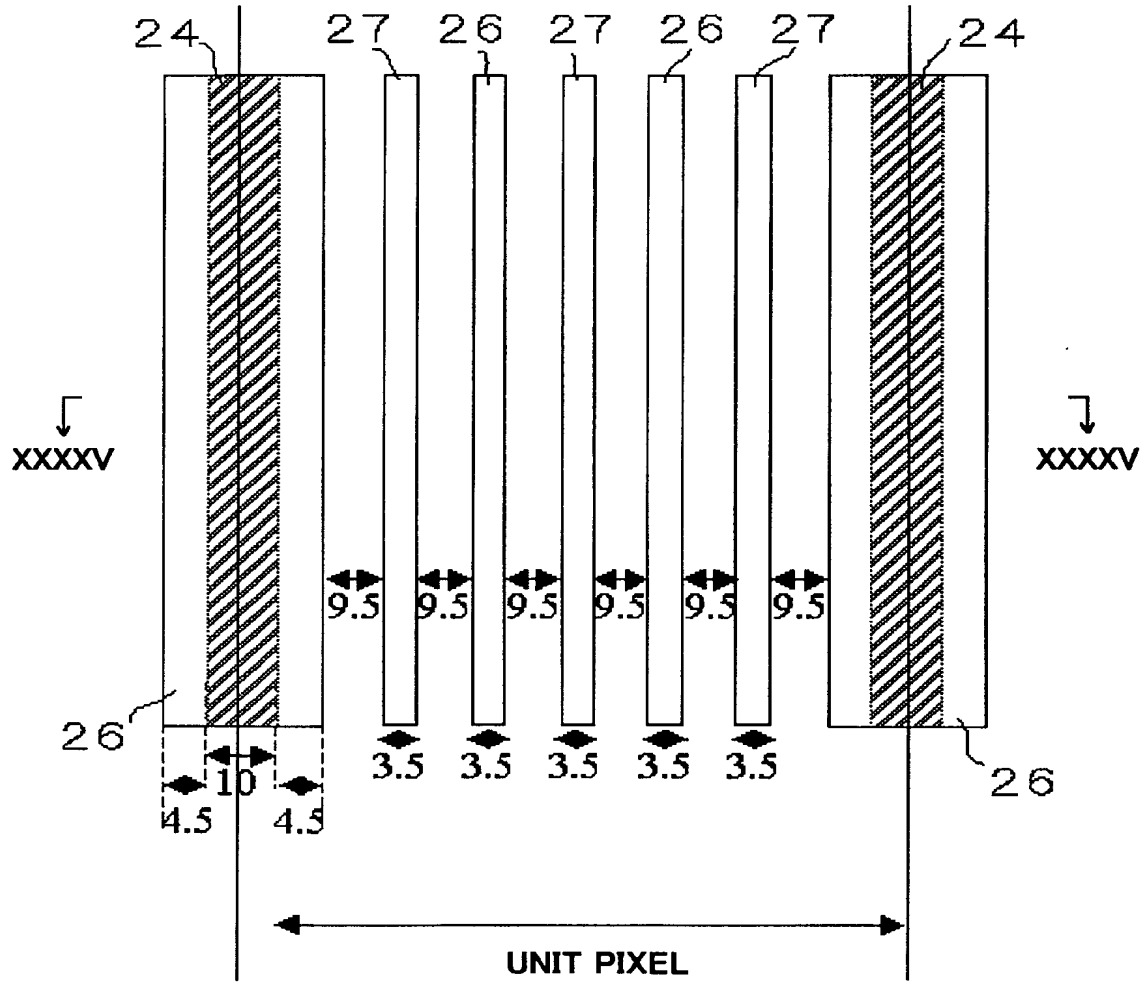
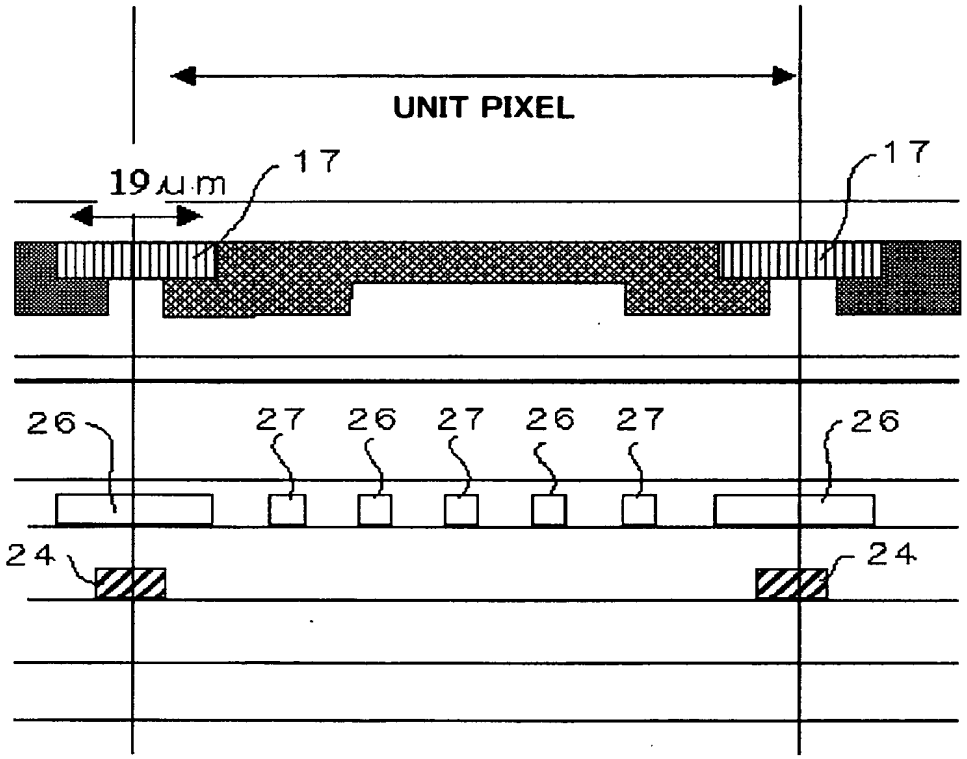

201
24
27
26
27
26
27
24
XXXXV
XXXXV
9.5
9.5
9.5
9.5
9.5
9.5
26
3.5
3.5
3.5
3.5
3.5
26
10
4.5
4.5
UNIT PIXEL

FIG.45

201



OPENING AREA = 57 x (LONGITUDINAL LENGTH)

FIG.46

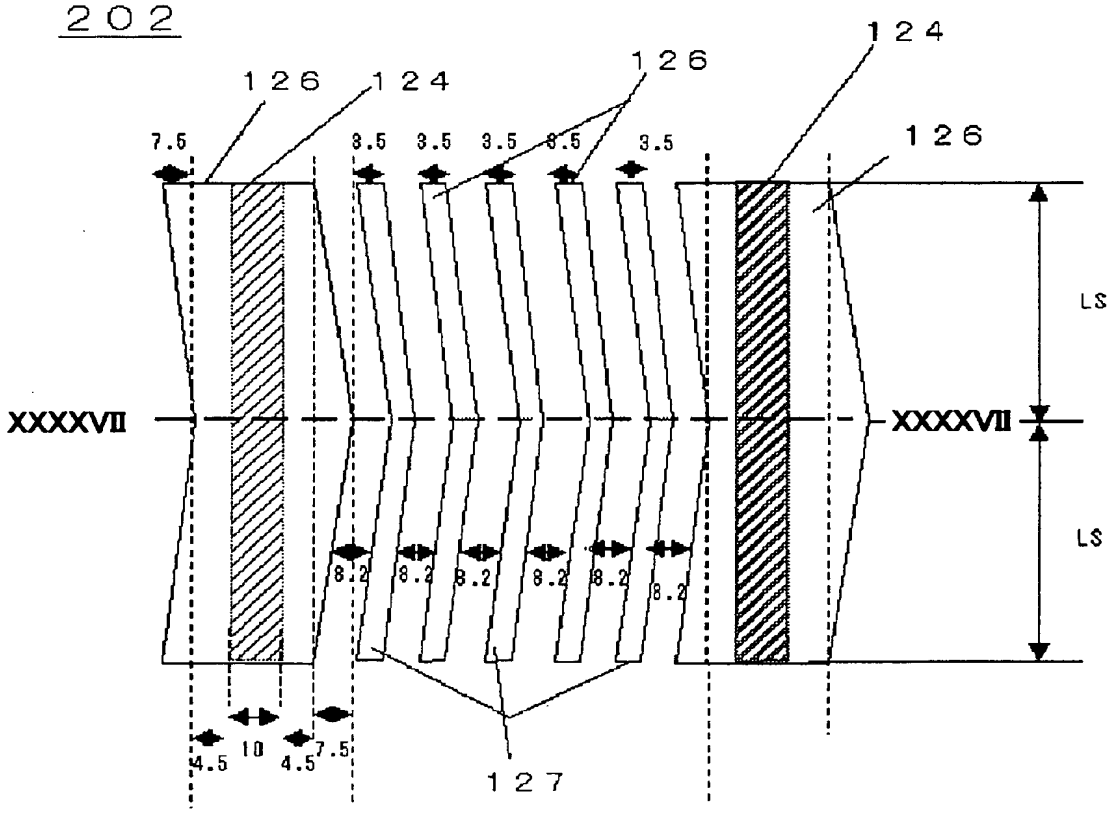
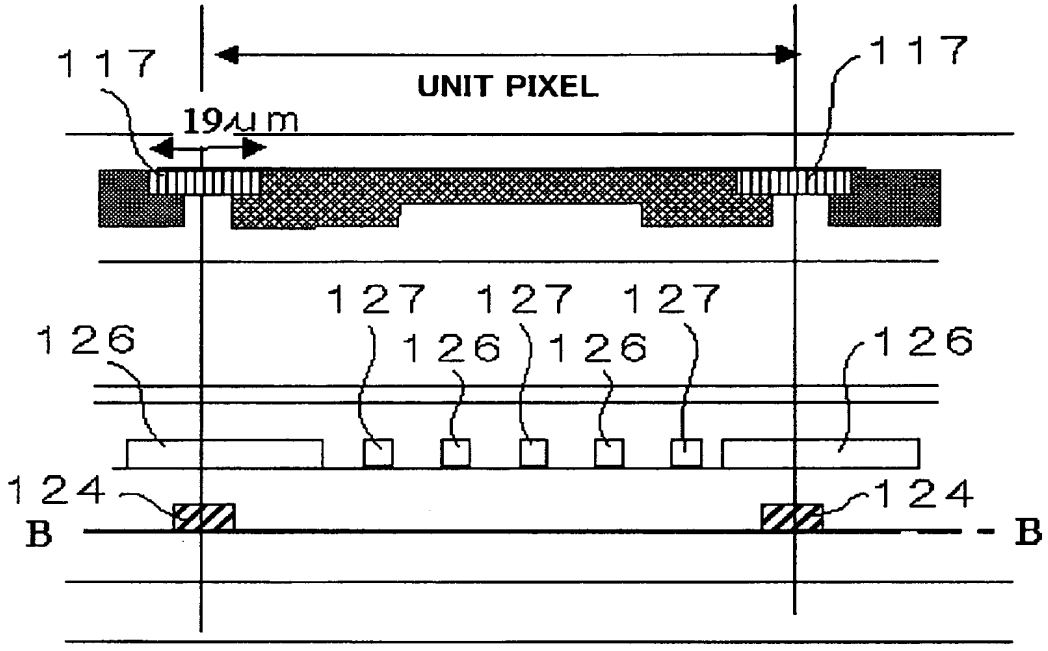

202
126
124
126
124
126
7.5
3.5
3.5
3.5
3.5
3.5
XXXXVII
XXXXVII
LS
LS
8.2
8.2
8.2
8.2
8.2
8.2
4.5
10
4.5
7.5
127

FIG.47

202



OPENING AREA = 49.2 x (LONGITUDINAL LENGTH)

FIG.48

203

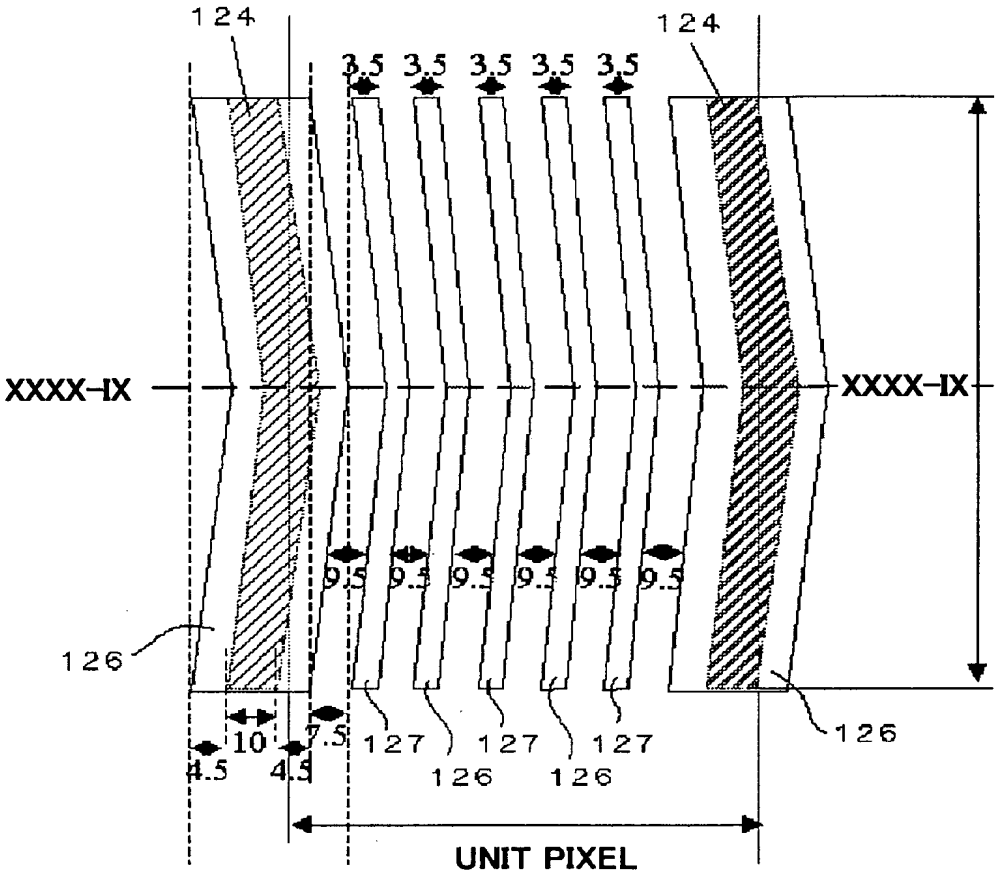
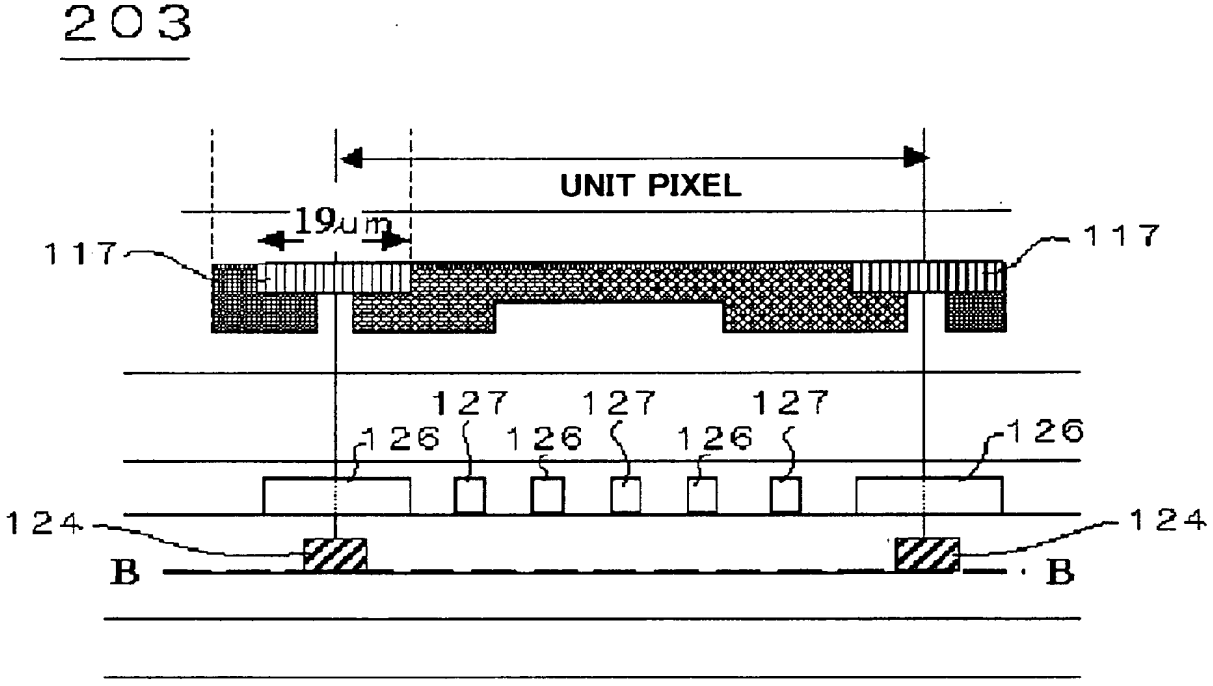

124
124
3.5
3.5
3.5
3.5
3.5
XXXX-IX
XXXX-IX
9.5
9.5
9.5
9.5
9.5
9.5
126
126
10
7.5
4.5
4.5
127
127
127
126
126
UNIT PIXEL

FIG.49



OPENING AREA = 57 x (LONGITUDINAL LENGTH)

FIG.50

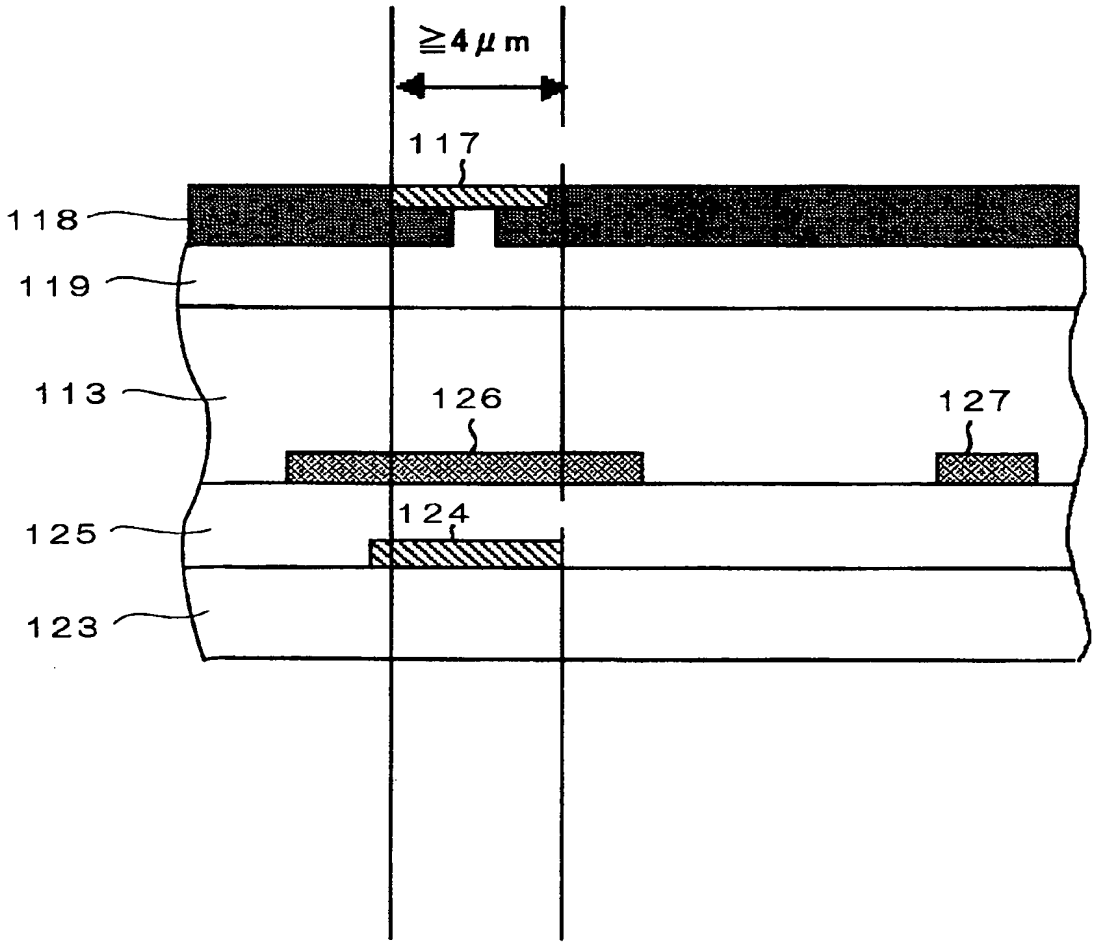


FIG.51

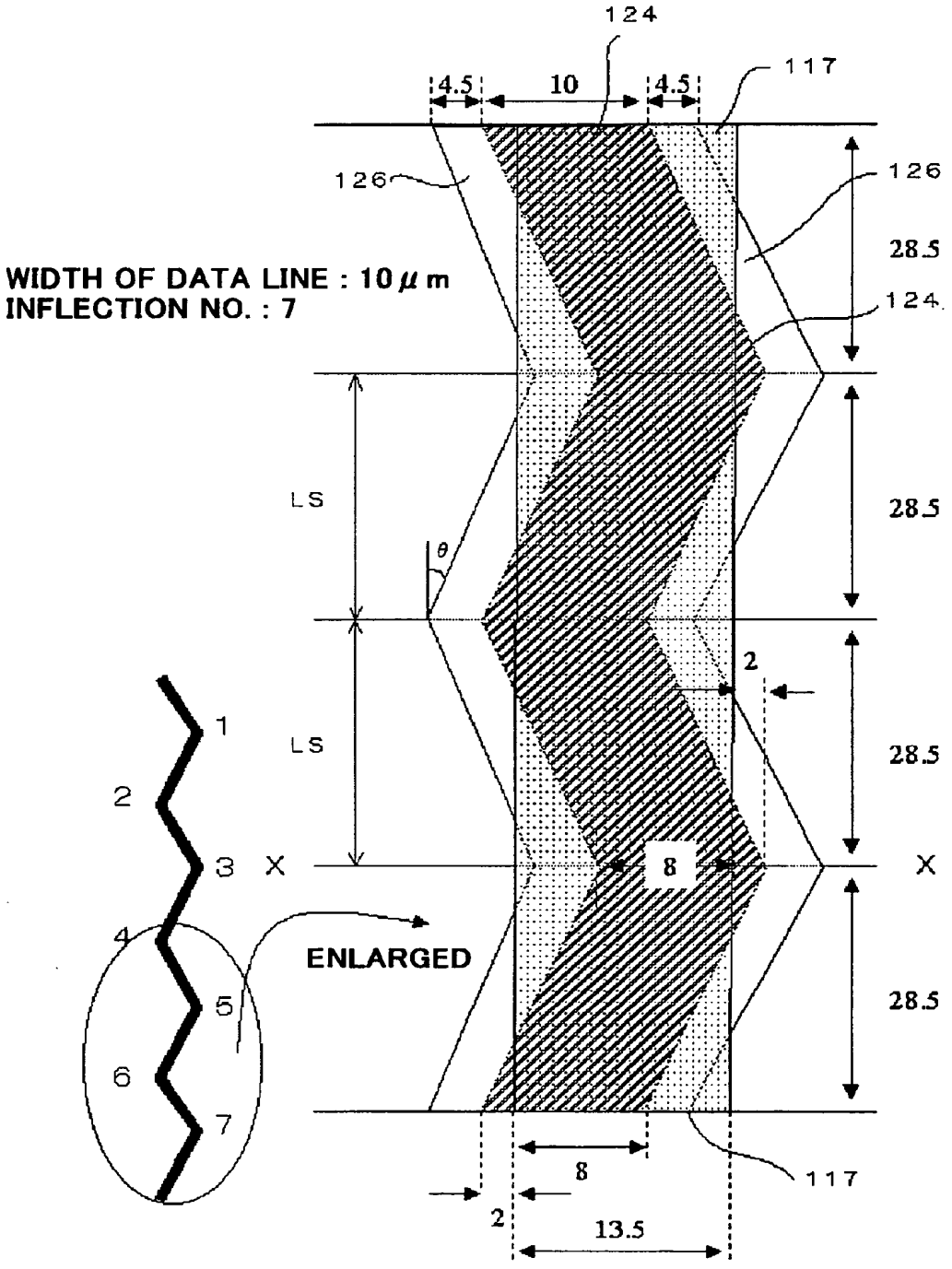

WIDTH OF DATA LINE : 10 μm
INFLECTION NO. : 7
124
117
4.5
10
4.5
126
126
28.5
124
LS
θ
28.5
2
LS
28.5
1
2
3
X
8
X
4
ENLARGED
5
28.5
6
7
8
117
2
13.5

FIG.52

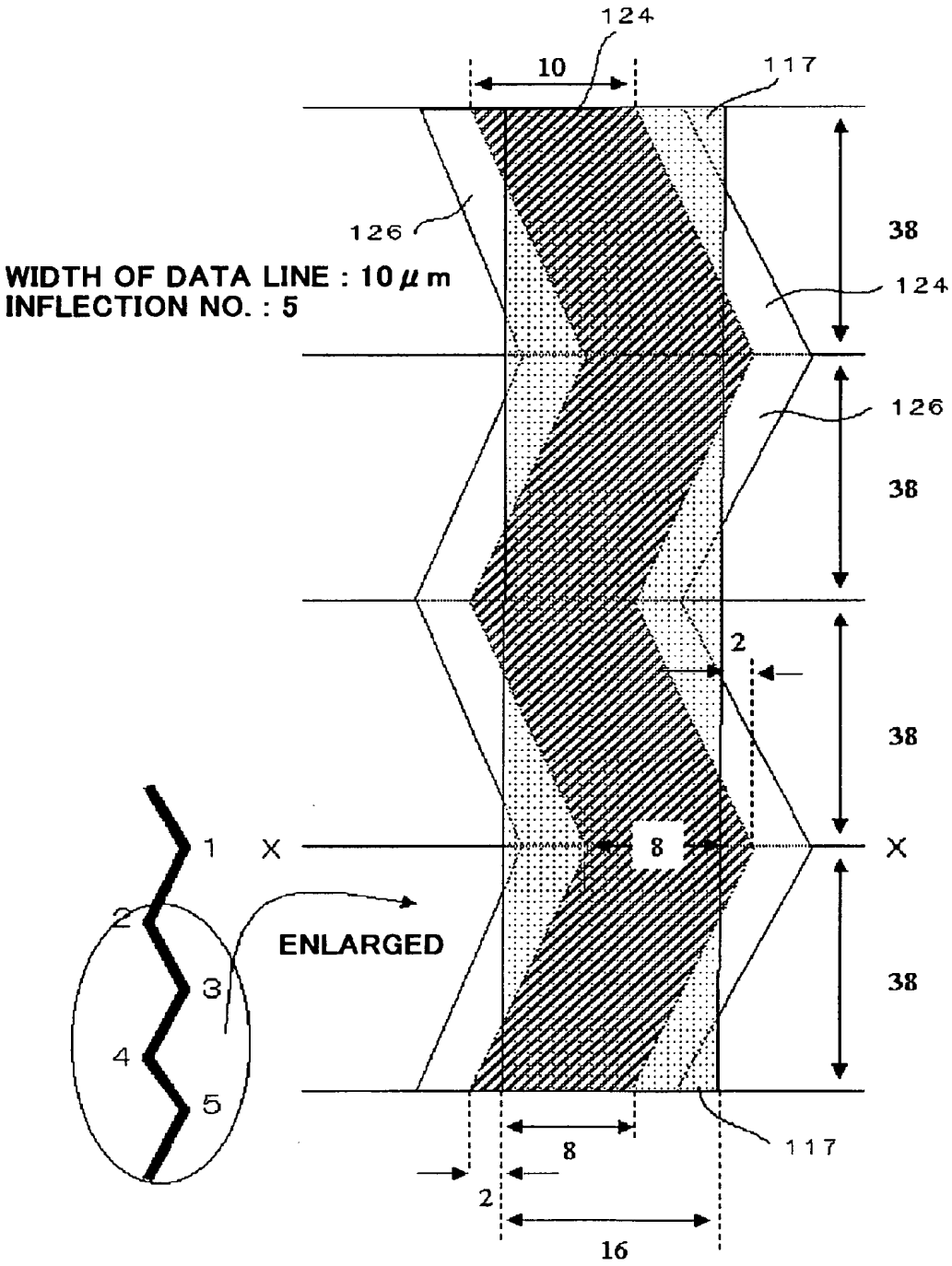

124
10
117
126
38
WIDTH OF DATA LINE : 10 μm
INFLECTION NO. : 5
124
126
38
2
38
1
X
8
X
ENLARGED
2
3
4
5
38
117
8
2
16

FIG.53

MINIMUM WIDTH OF BM
Dmin = D + LS × tan θ −(D−8)×2

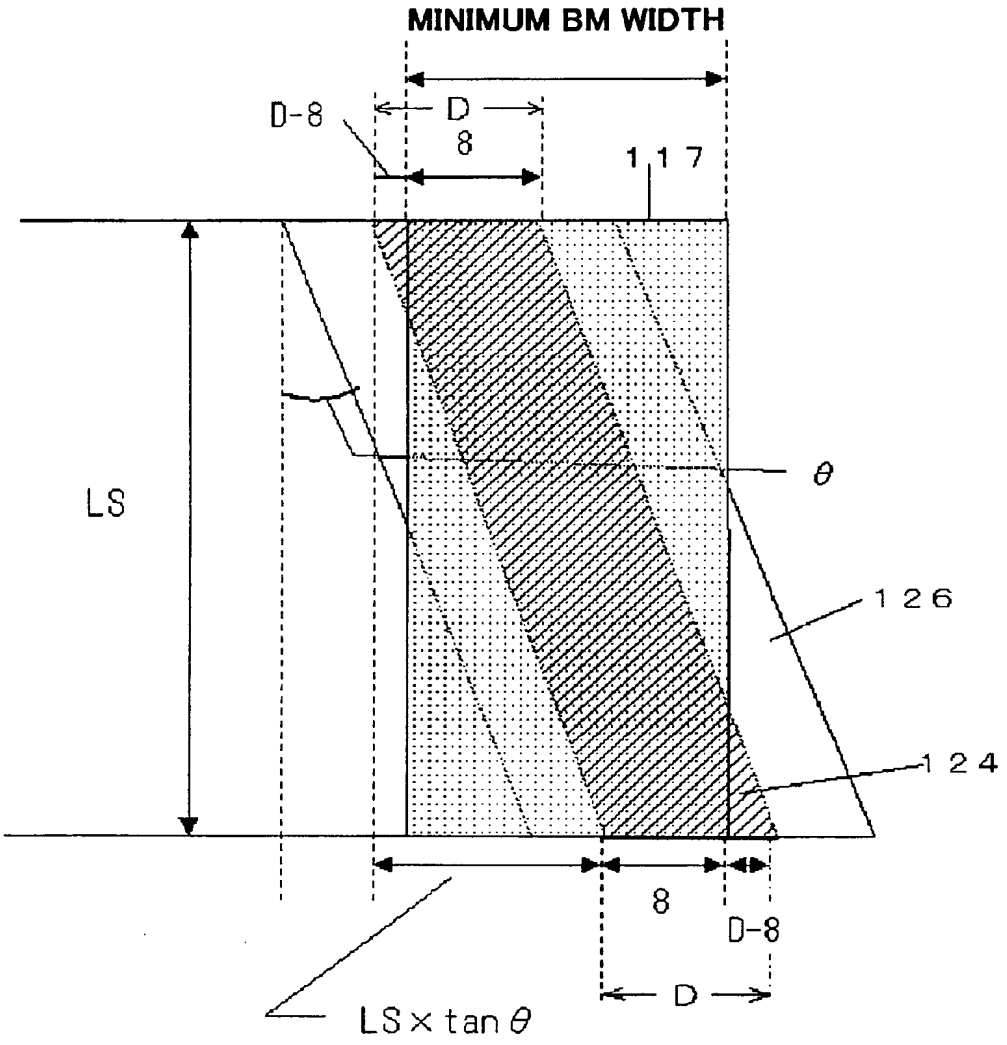


FIG.54

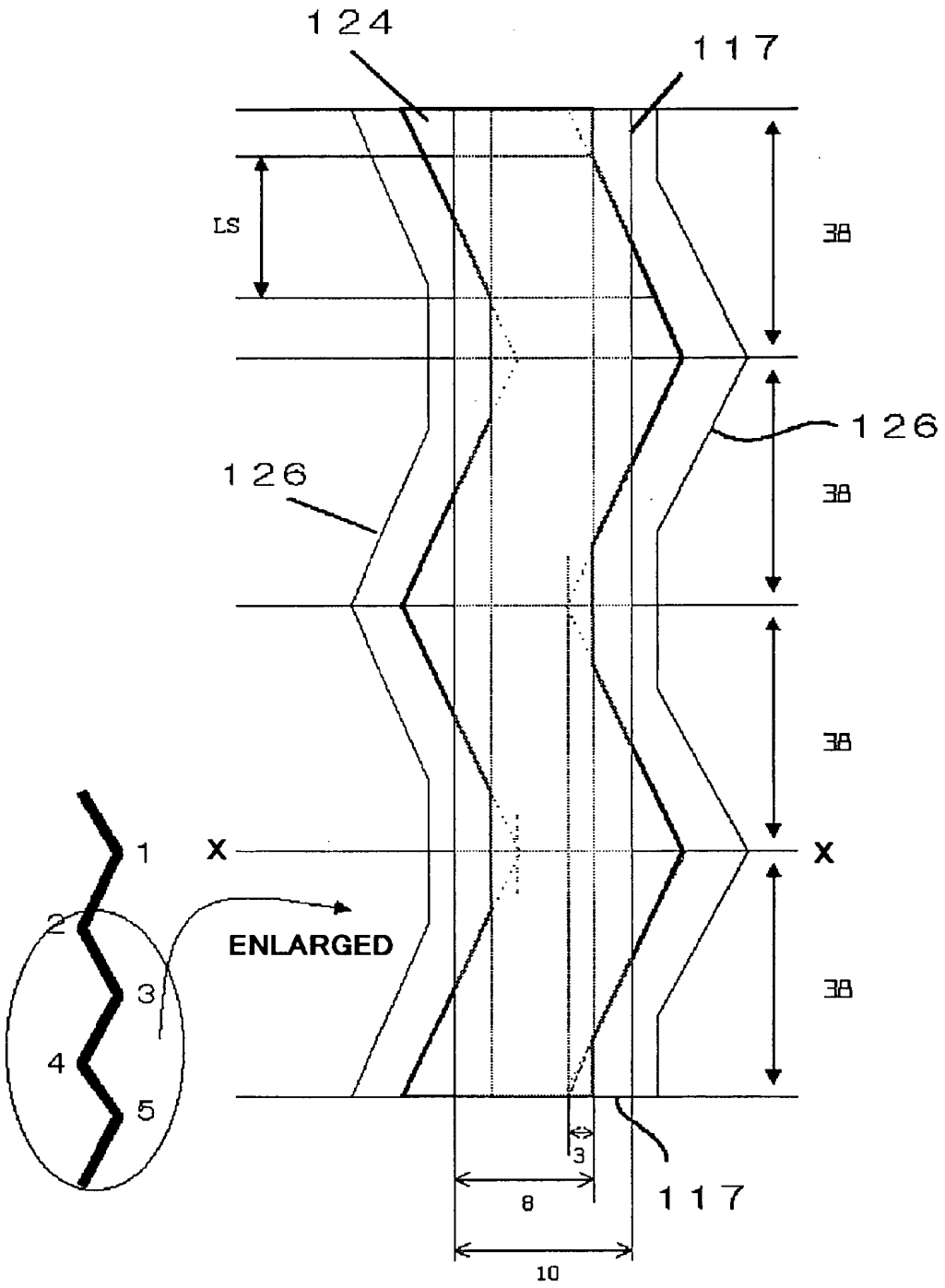


FIG.55

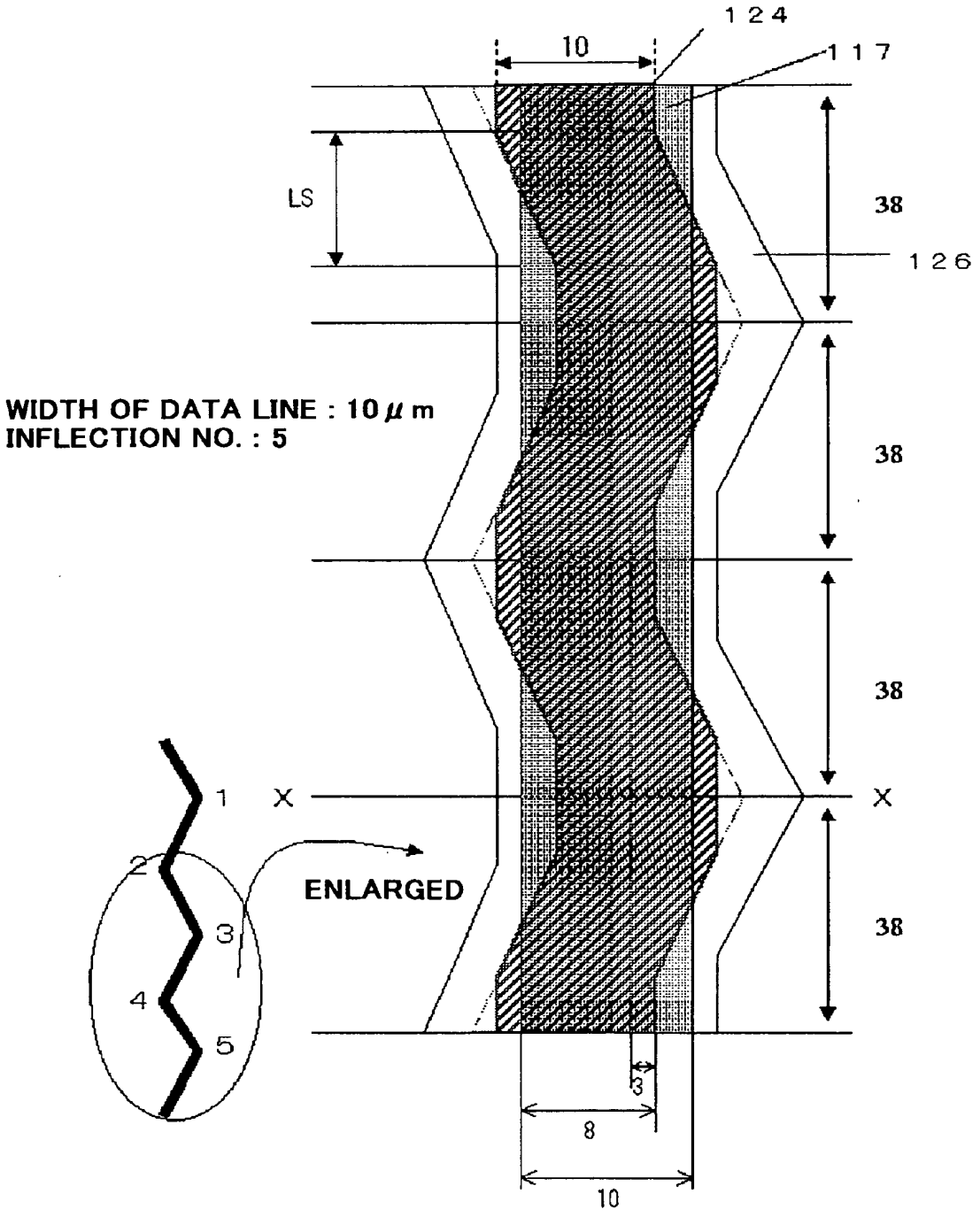

124
10
117
LS
38
126
WIDTH OF DATA LINE : 10 μm
INFLECTION NO. : 5
38
38
38
1
X
X
2
3
4
5
ENLARGED
3
8
10

FIG.56

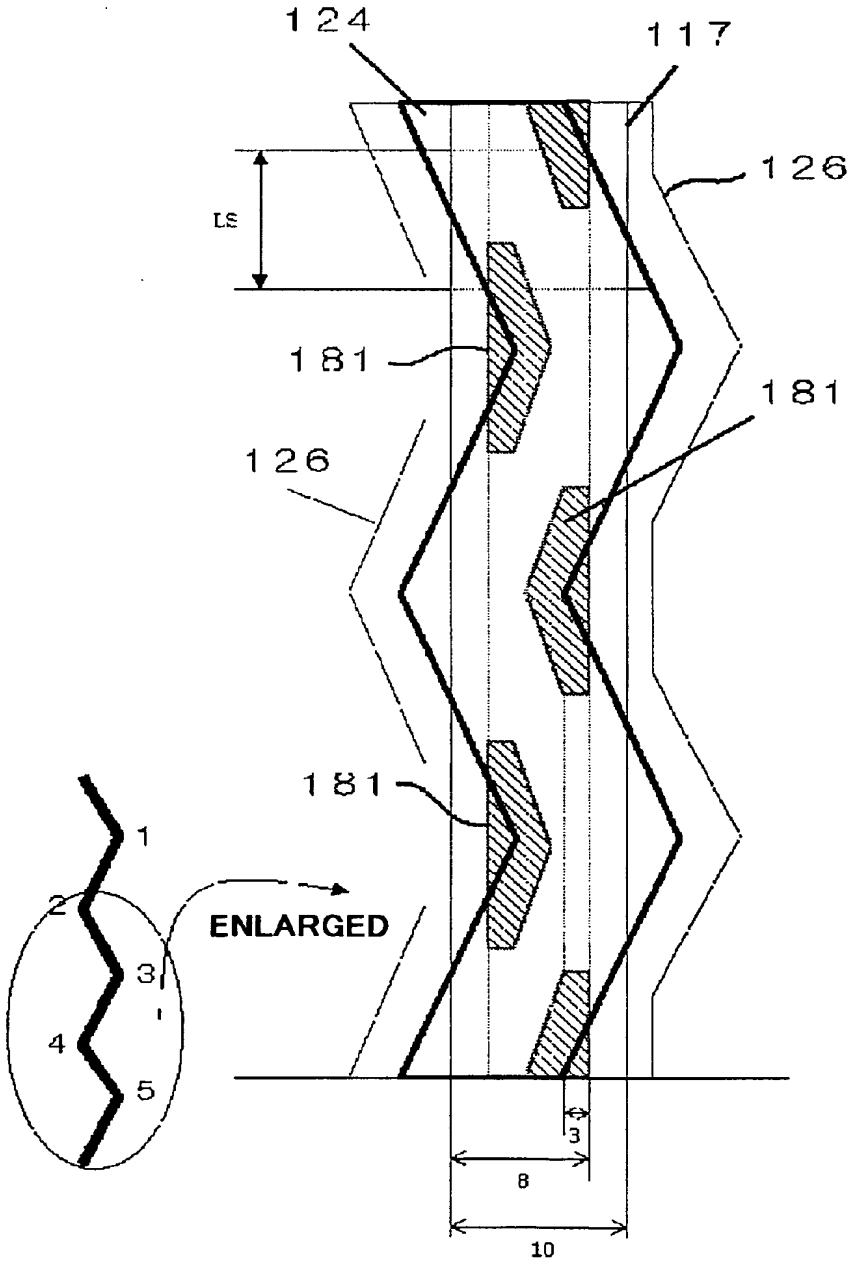


FIG.57

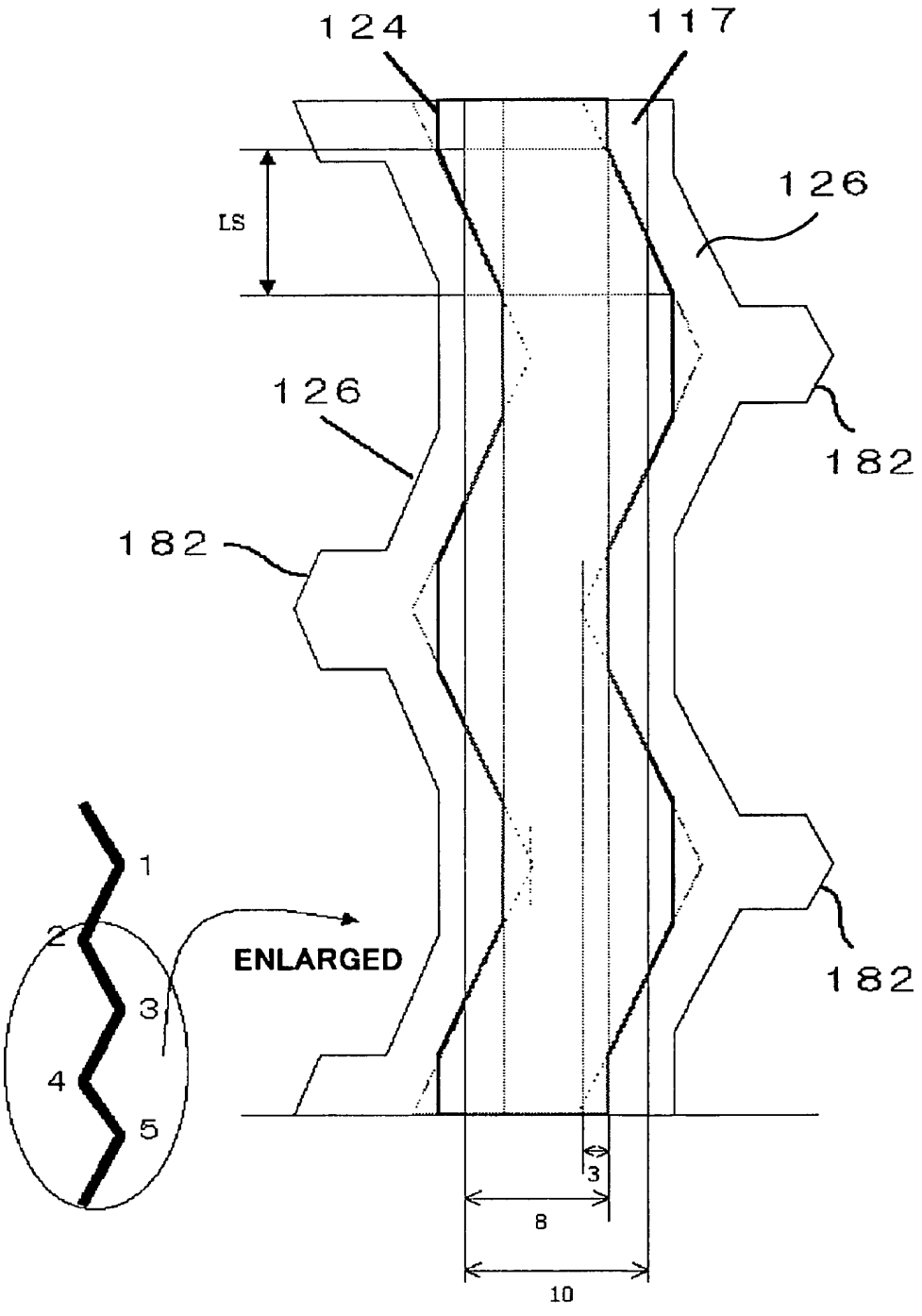


FIG.58

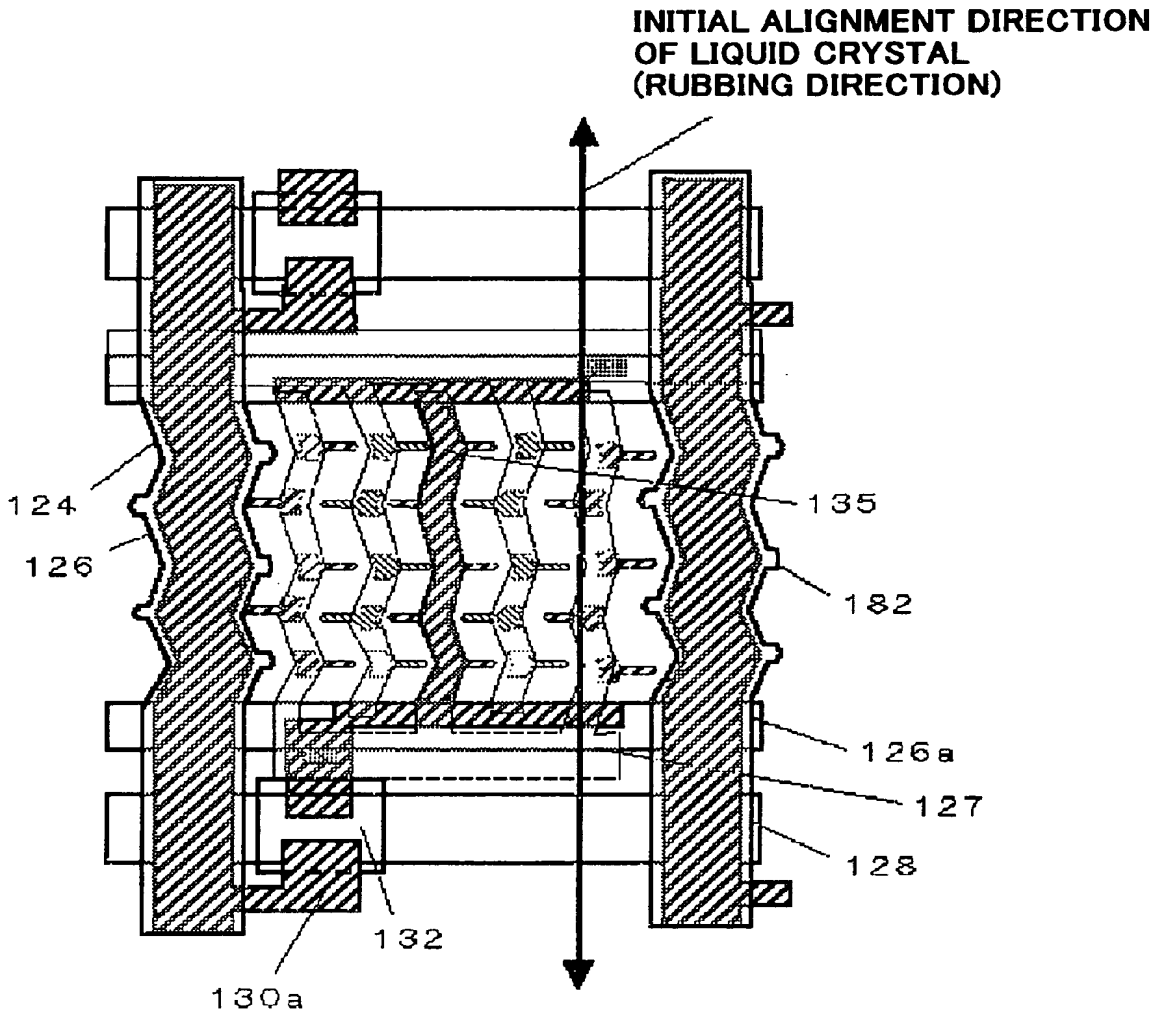

INITIAL ALIGNMENT DIRECTION
OF LIQUID CRYSTAL
(RUBBING DIRECTION)
124
126
135
182
126a
127
128
132
130a

FIG.59

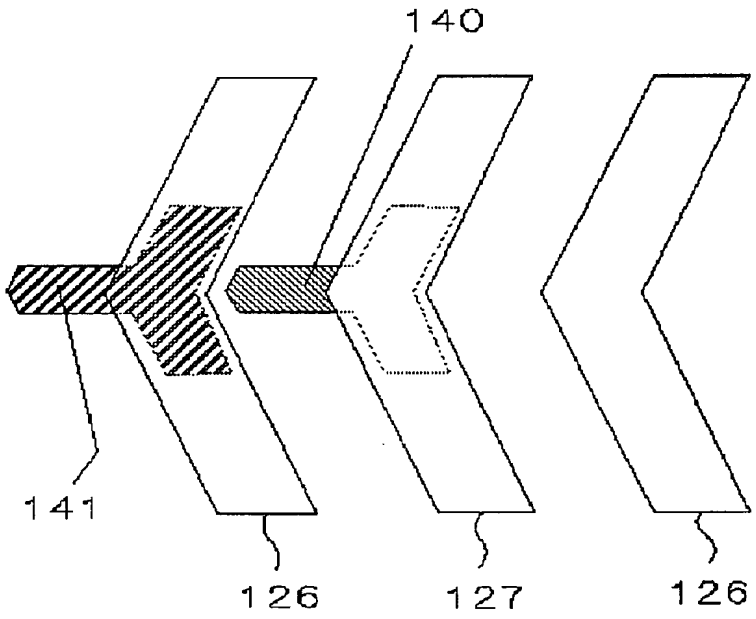


FIG.60

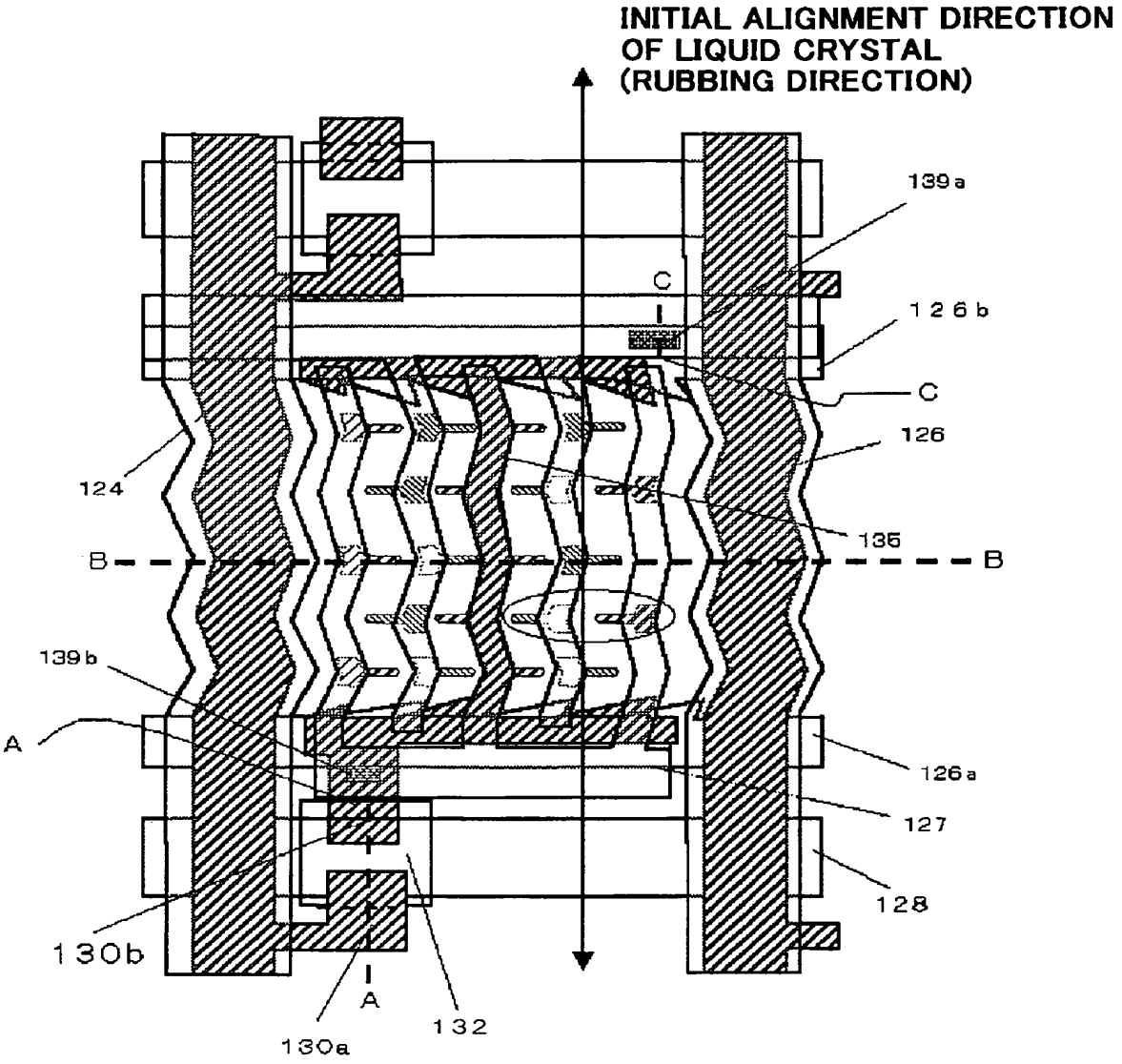
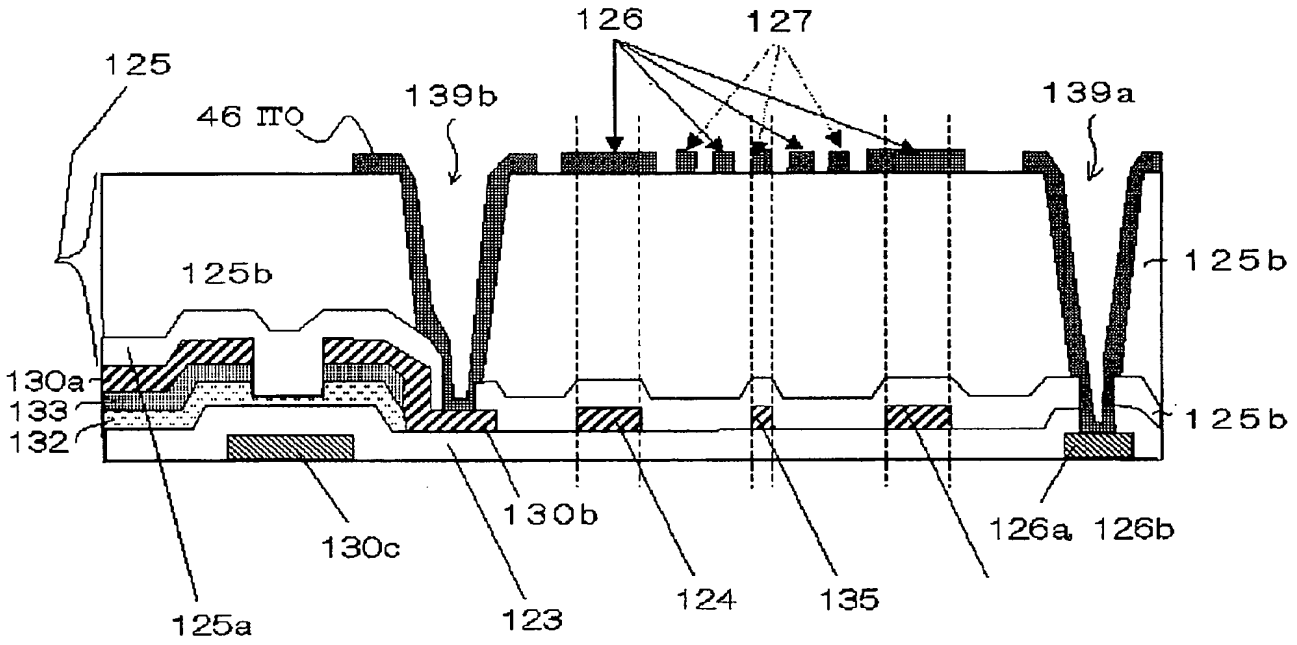

INITIAL ALIGNMENT DIRECTION
OF LIQUID CRYSTAL
(RUBBING DIRECTION)
139a
C
126b
C
126
124
135
B
B
139b
A
126a
127
128
130b
A
132
130a

FIG.61



TFT REGION	PIXEL REGION	CONTACT HOLE REGION
(A-A)	(B-B)	(C-C)

FIG.62A

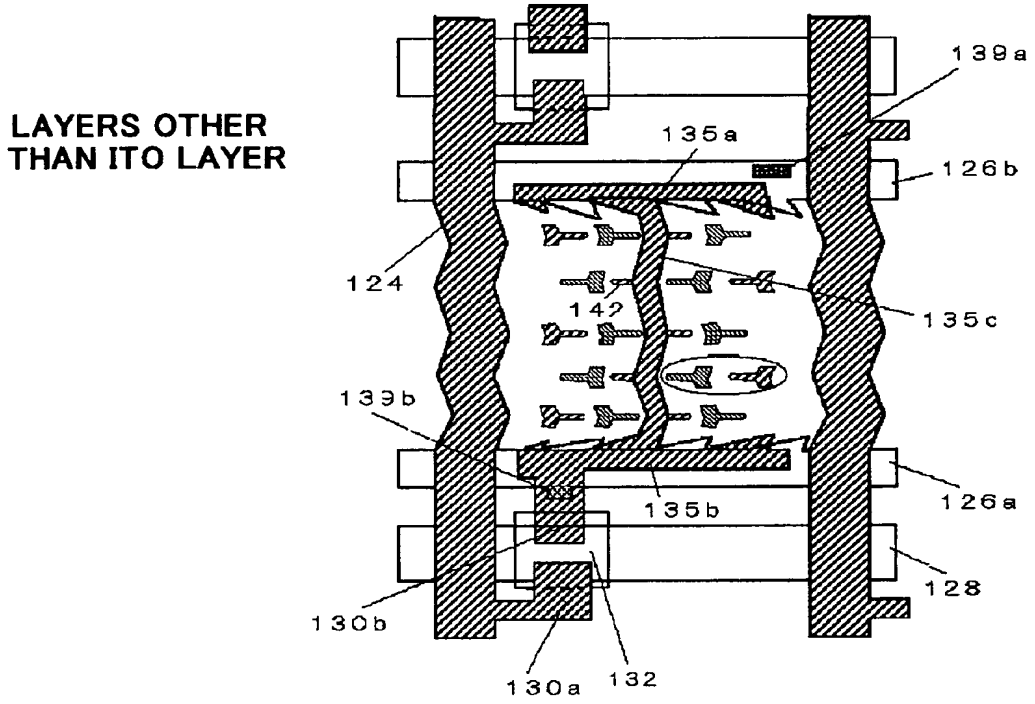


FIG.62B

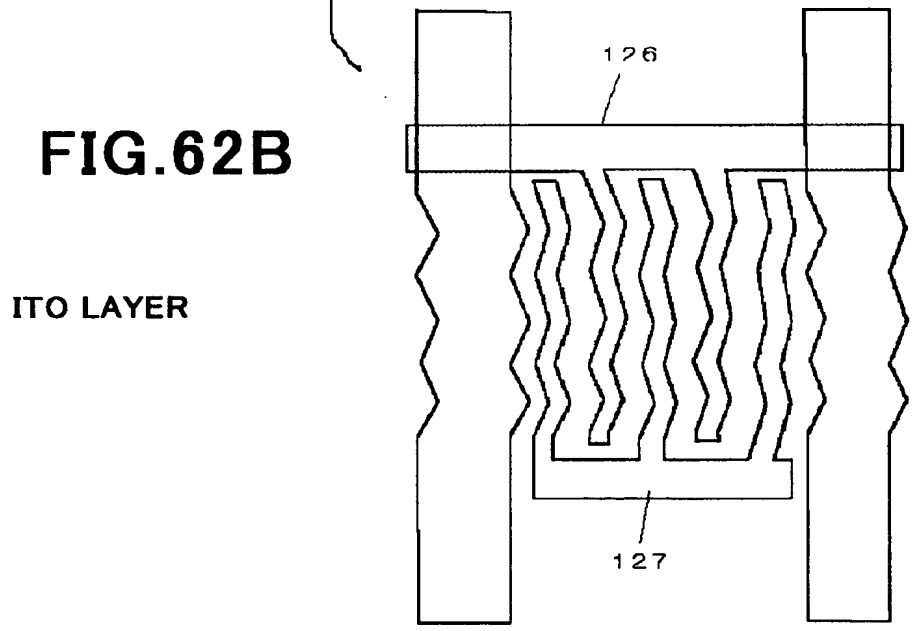


FIG.65

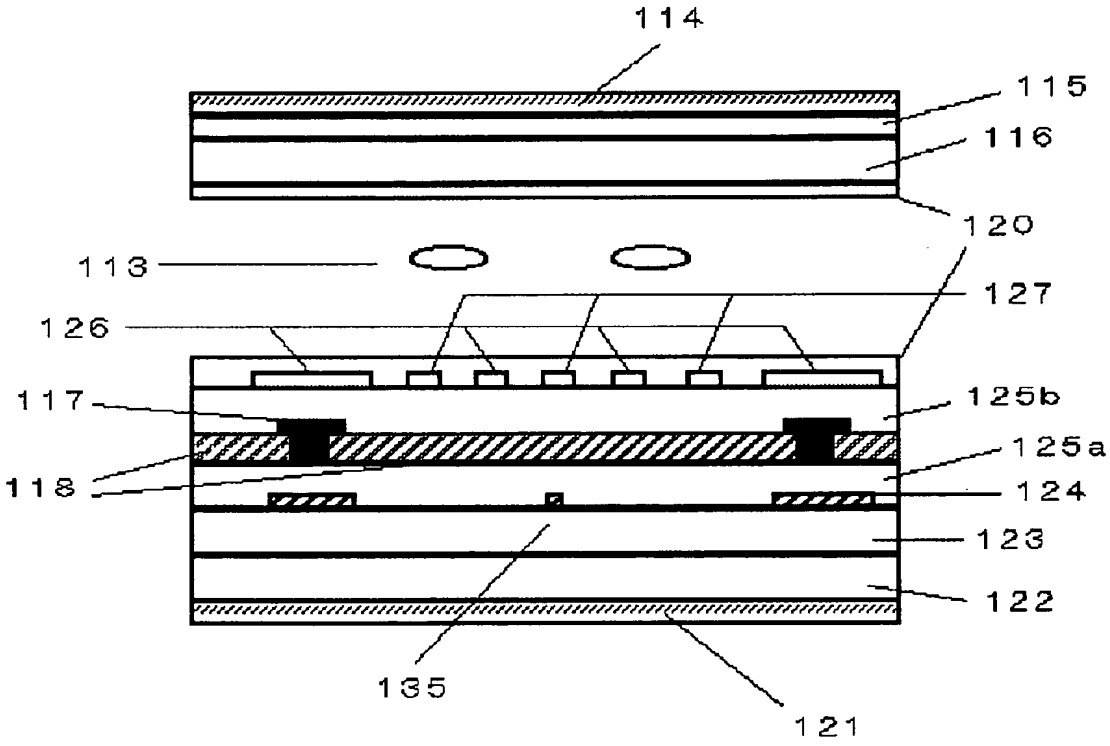

114
115
116
120
113
127
126
117
125b
125a
118
124
123
122
135
121

FIG.66

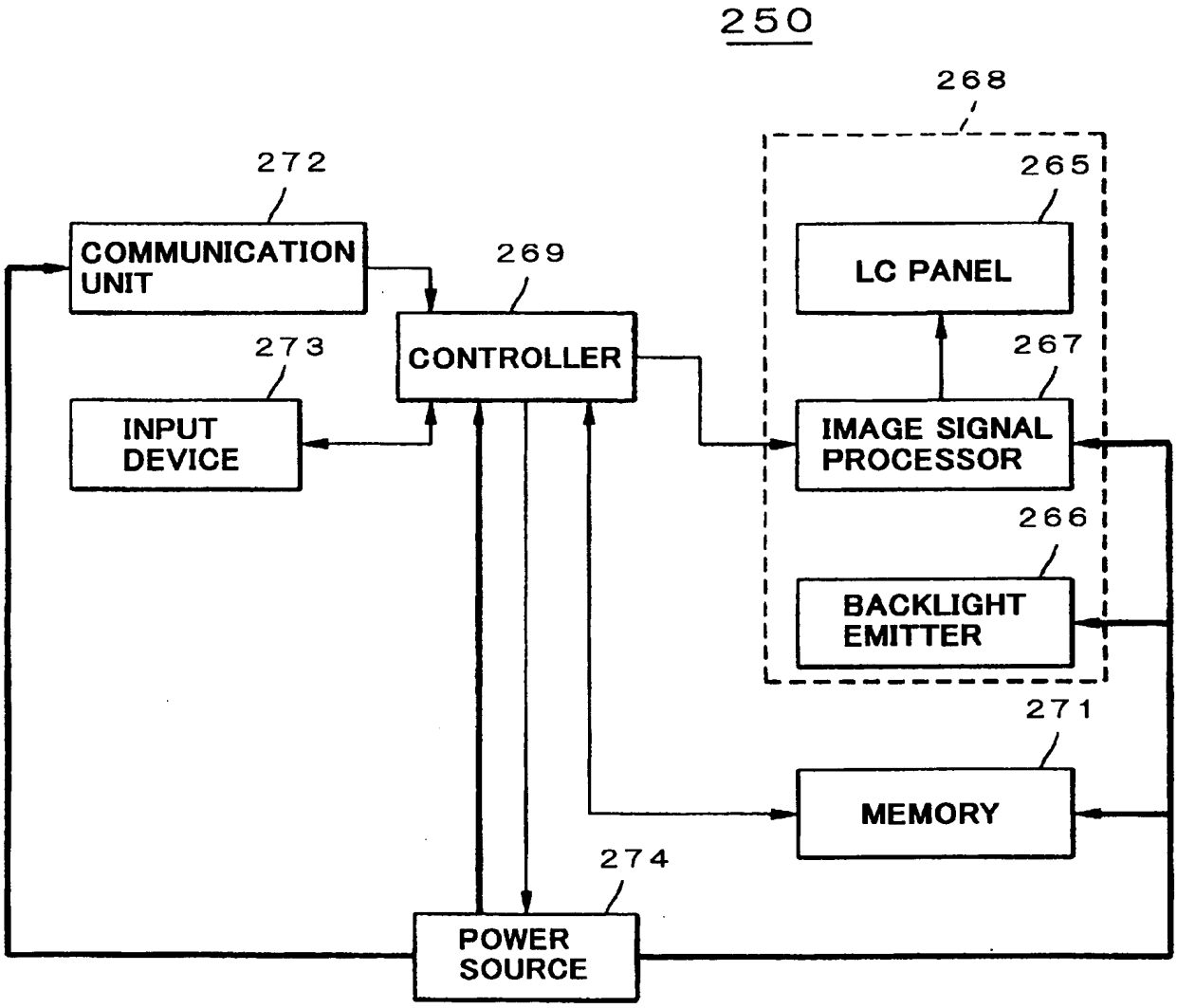

250
268
272
265
COMMUNICATION UNIT
269
LC PANEL
273
CONTROLLER
267
INPUT DEVICE
IMAGE SIGNAL PROCESSOR
266
BACKLIGHT EMITTER
271
MEMORY
274
POWER SOURCE

FIG.67

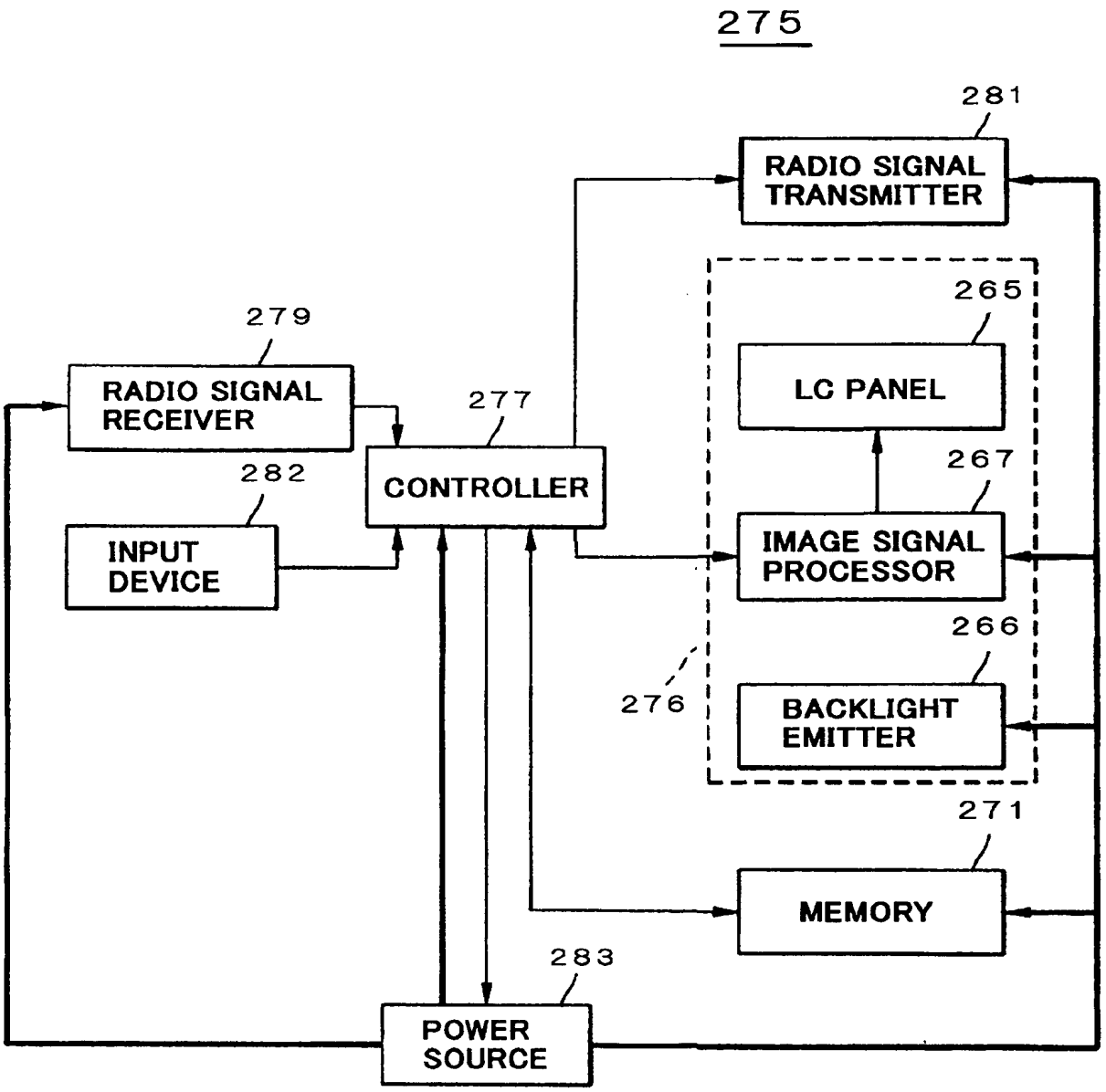

275
281
RADIO SIGNAL TRANSMITTER
265
LC PANEL
279
RADIO SIGNAL RECEIVER
277
CONTROLLER
267
282
INPUT DEVICE
IMAGE SIGNAL PROCESSOR
266
276
BACKLIGHT EMITTER
271
MEMORY
283
POWER SOURCE

FIG.65

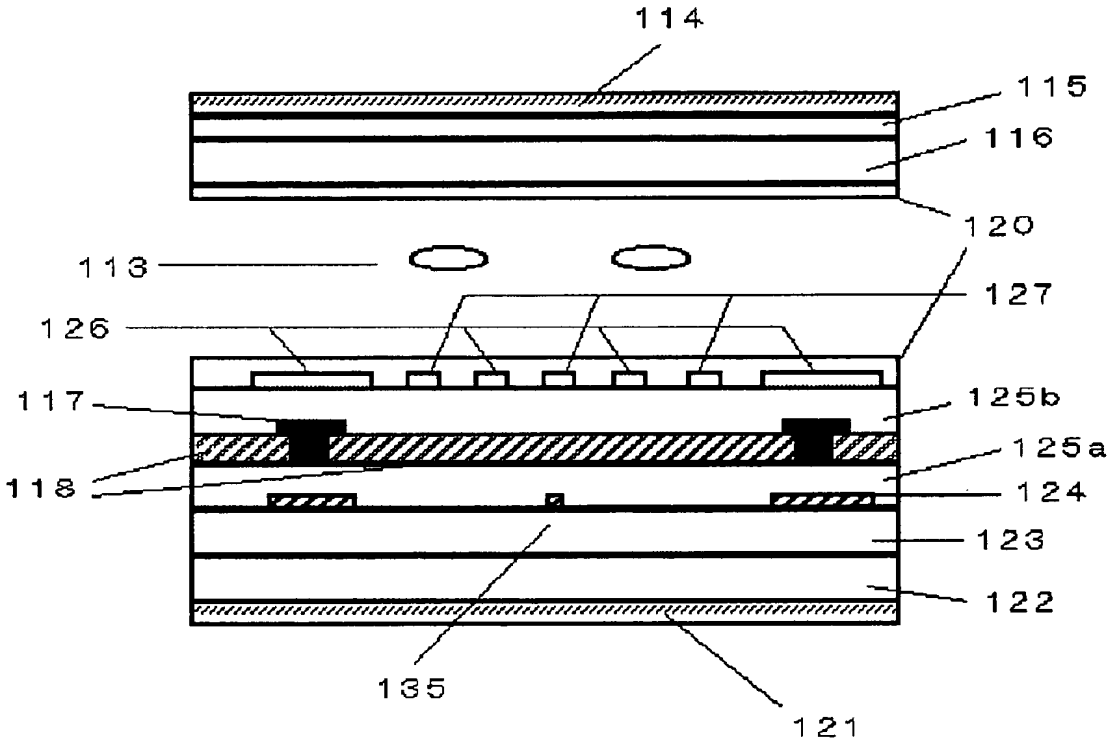

114
115
116
120
113
127
126
117
125b
125a
118
124
123
122
135
121

FIG.66

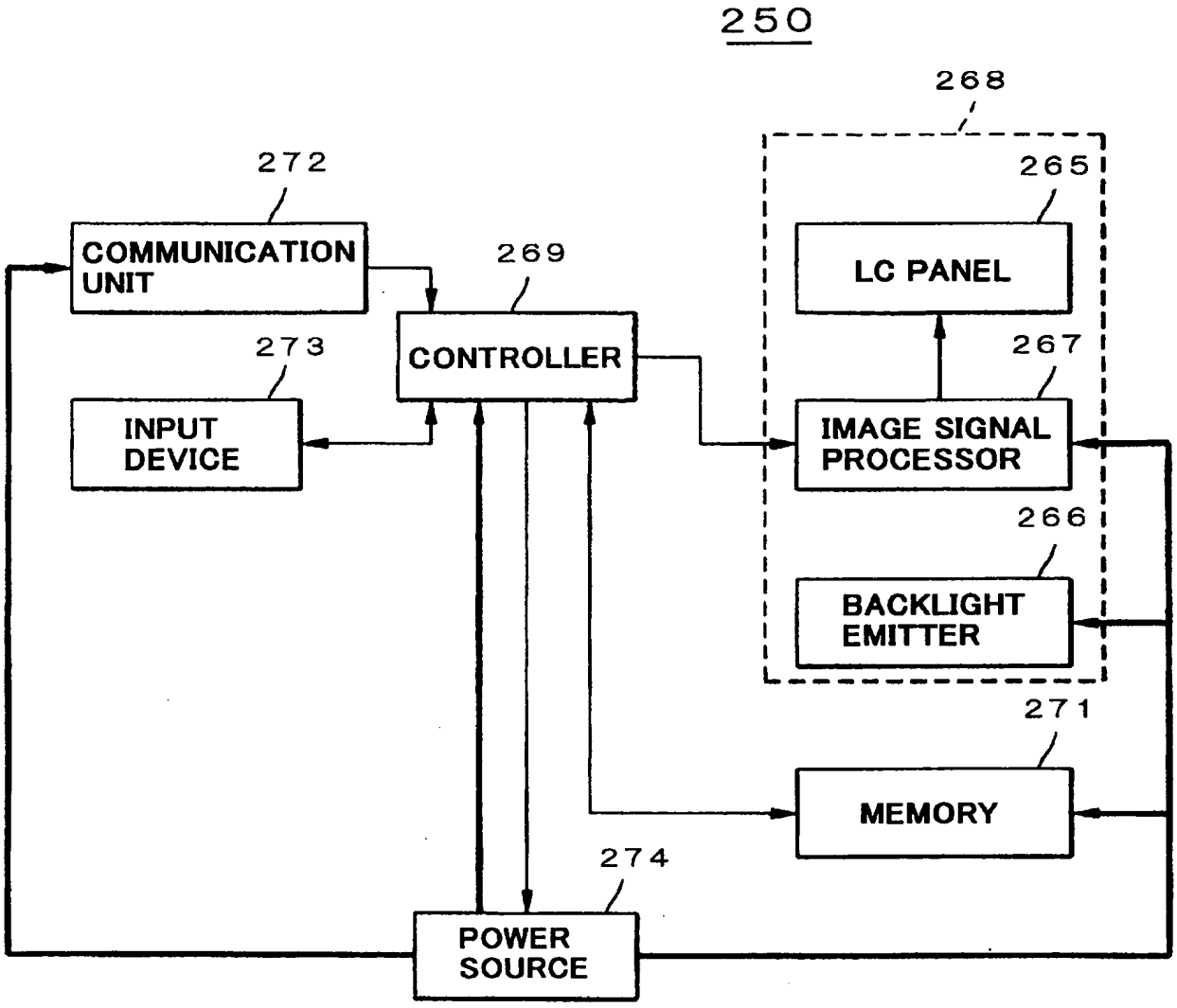
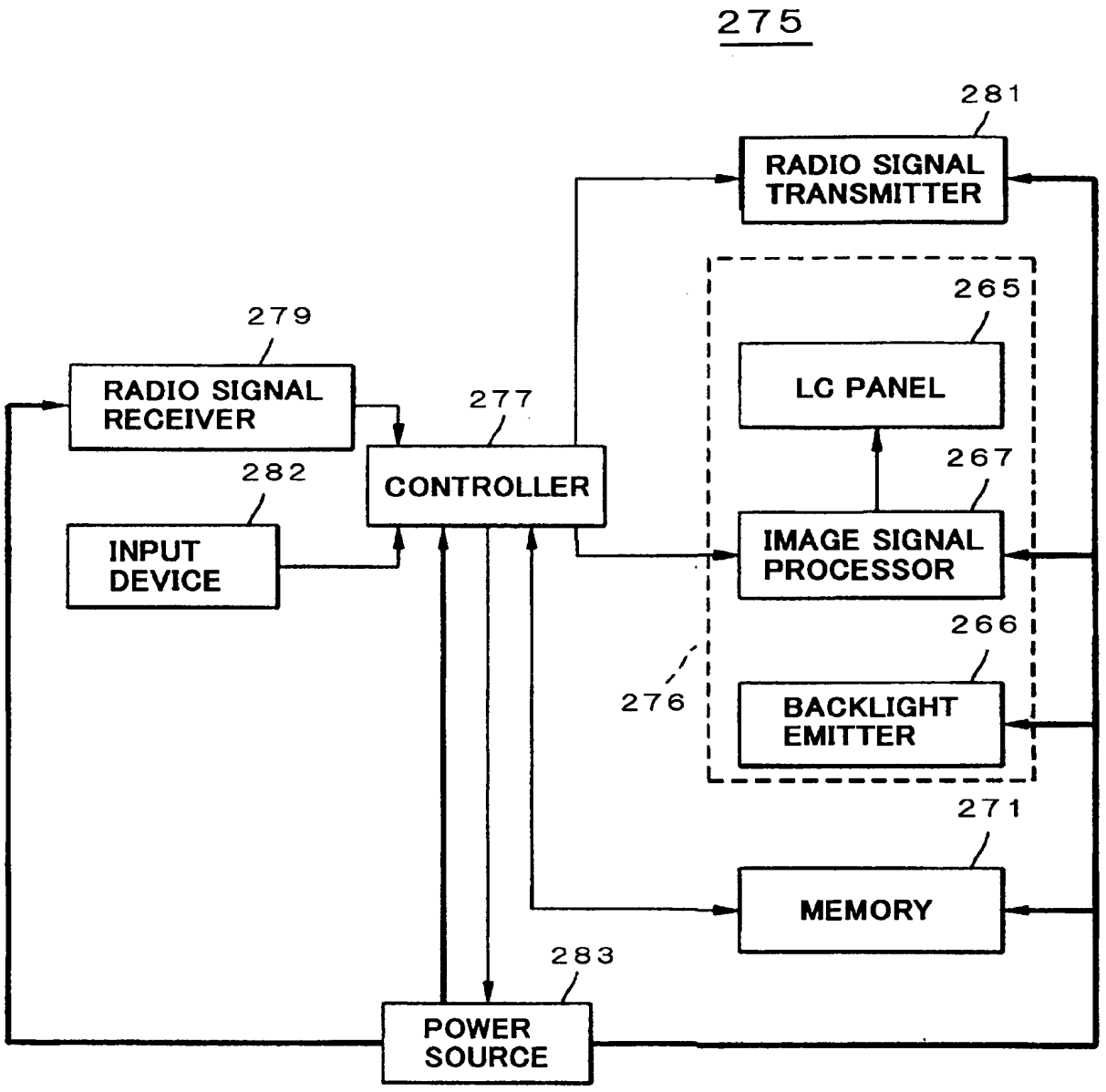

250
268
272
265
COMMUNICATION UNIT
269
LC PANEL
273
CONTROLLER
267
INPUT DEVICE
IMAGE SIGNAL PROCESSOR
266
BACKLIGHT EMITTER
271
MEMORY
274
POWER SOURCE

FIG.67


275
281
RADIO SIGNAL TRANSMITTER
265
LC PANEL
279
RADIO SIGNAL RECEIVER
277
CONTROLLER
267
282
INPUT DEVICE
IMAGE SIGNAL PROCESSOR
266
276
BACKLIGHT EMITTER
271
MEMORY
283
POWER SOURCE